

12.3.3 Objectives to achieve the Vision

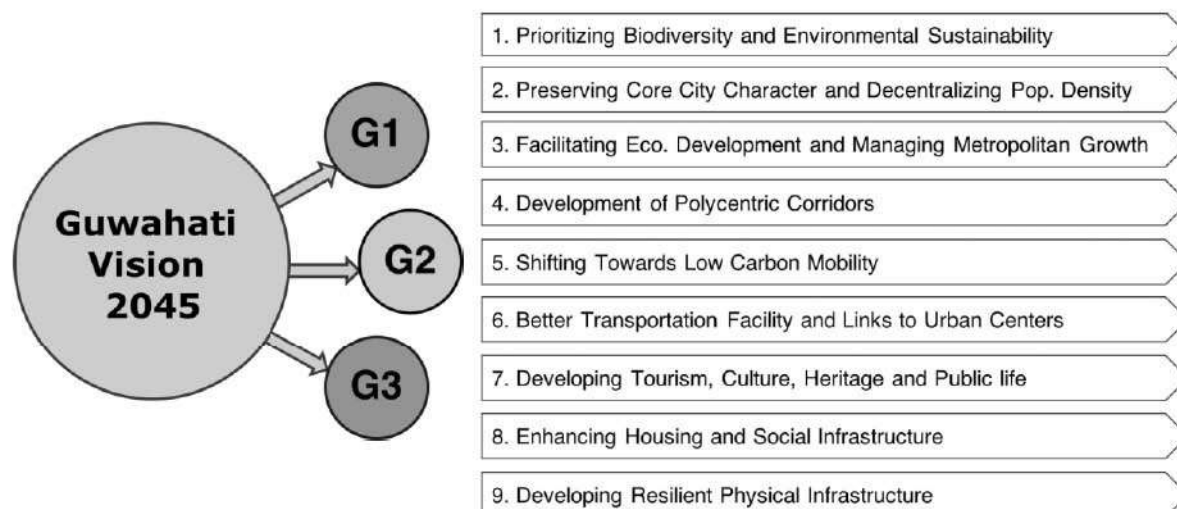


Figure 12-1 Vision Guwahati Master Plan 2045 and Objectives

Objective 1: Prioritizing Biodiversity and Environmental Sustainability.

- Prioritizing environmental concerns for the development of Guwahati and focus on rejuvenation of natural assets and creating a diverse portfolio of natural and planned open spaces.
- Protecting wetlands, water bodies, wildlife sanctuaries and biodiversity.
- Conserving green cover of Hills and Tree Clad area and river flood plain area
- Ensuring that water resources are managed in a sustainable way
- Reducing the amount of waste generated and encourage increased reuse and recycling of waste materials
- Reducing the impact of stormwater on bays and catchments
- Ensuring that development restricted on and near by natural features by providing buffer zones
- Protecting native habitat and areas of important biodiversity through appropriate land-use planning

Objective 2: Preserving Core City Character and Decentralizing Population Density

- Preserving heritage buildings as a focus for high-quality cultural development, recreational activity and living for the whole community.
- Broadening the base of activity in centres that are currently dominated by public & semi-public area to include a wider range of services over longer hours, and development of more economic centers.
- Decentralizing the compact city core area and locate a substantial proportion of

new housing close to outer activity centres and other strategic redevelopment sites that offer good access to services and transport.

Objective 3: Facilitating Economic Development and Managing Metropolitan Growth

- Promoting clean economies, facilitate a unique economic role for Guwahati while ensuring symbiotic linkages with capital region Dispur, improve the overall investment climate and support a variety of work and workspace typologies.
- Supporting conversion of strategic industrial estates and District Centres into specialized clusters of knowledge, finance, services, culture or creative industries Concentrate urban expansion into growth areas that are served by high-capacity public transport.
- Modernization of work centres through regeneration incentives
- Developing organized daily market centres cum parking facility at present locations of unauthorised vending areas to integrat informal sensor in planned urban growth.
- Protect the green wedges of urban Guwahati from inappropriate development

Objective 4: Shifting Towards Low Carbon Mobility

- Encouraging modal shift in favour of public and shared modes of transport.
- Transit-oriented development aligned with mass transit by bringing homes and jobs closer to mass transit
- Recusing vehicular congestion and provide efficient, affordable and green mobility options.
- Unified institutional framework for mobility management
- Focus on improving Non Motorised Transport
- Encouraging mainstreaming electric vehicles and other green mobility options
- Multi-modal integration (including development of multi-modal hubs) and facilitation of first and last mile connectivity

Objective 5: Better transportation facility and links to urban centres

- Developing ring roads and linking more radial road to decongest core city centre area.
- Upgrade and develop the Principal Public Road Network through linking arterial roads as Ring road
- Provision of local public transport services to connect activity centres and link growth centres to the regional Guwahati city.

- Organized parking facility and Strengthened local accessibility avoiding through traffic
- Multi Modal Logistic Park (MMLP) for better state freight connectivity neighbouring Truck Terminal and Goods & Market Yard to provide a comprehensive transport system
- Manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure

Objective 6: Developing new neighbourhood and polycentric corridors

- Polycentric corridor will help reduce the burden of providing sufficient infrastructure from the core city centre area.
- Poly centres will work as the magnet and will develop multi-cores, multi-centers, multi-clusters, clustered spatial layout, and multi-spots.
- The main functions of these centers such as commercial centers for industry development have also been defined and the connections among the main center has been developed.

Objective 7: Developing Tourism, Culture, Heritage and Public life

Development of tourism circuit connecting Spiritual, Leisure, Heritage, Wild life, Ethnic & Eco tourism destinations.

- Promote good urban design to make the environment more liveable and attractive
- Implementation of active frontage, squares and plazas, street improvement, walkable plans for public spaces and safety
- Recognise and protect cultural identity, neighbourhood character and sense of place
- Protect and promote heritage places and its values
- Improve the quality and distribution of local open space and ensure long-term protection of public open space

Objective 8: Enhancing Housing and Social Infrastructure

- Increasing the supply of well-located affordable housing
- Promoting of rental, small format and affordable housing (particularly close to mass transit)
- Planning for a more equitable distribution of social infrastructure and vending area through neighbourhood centres
- Developing a strong cultural environment and increase access to arts, recreation

and other cultural facilities

Objective 9: Developing Resilient Physical Infrastructure

- Improving the coordination and timing of the installation of services and infrastructure in new development areas
- Integrated water resource management (combined policy for water supply, wastewater management and storm water management) for long term water security
- Norms for decentralisation of wastewater treatment, recycling of wastes and maximum reuse of recycled water and solid waste

12.4 Planning Theories

The planning is based on order of settlement, level of urbanization, planning area morphology it's evident that the growth over the last few decades are spearheaded due to certain factors like spatial organization of the several urban functions of commerce, production, education, and much more. One of the most important forces determining where certain activities or growth is focused within a city deals with the price of land. Thus, it is important to understand different urban models developed over the course of time. The different planning theories are explained in the following section to understand which theoretical model suits best for the planning area.

12.4.1 Concentric Zone Model

The Concentric Zone model is a model of the internal structure of cities in which social groups are spatially arranged in a series of rings. The concentric zone model was resulted from a study of Chicago in the 1920's by Ernest Burgess. This model is also known as Bull's eye Model. The idea behind this model is that the city grows outward from a central area in a series of rings. The size of the rings may vary, but the order always remains the same. Under this model, five concentric functional zones are recognized. At the center was the CBD (1). The zone of transition (2) was characterized by residential deterioration and encroachment by business and light manufacturing. The zone of independent workers' homes (3) was primarily occupied by the blue collar (wage-earners, manual laborers) labor force. The zone of better residences (4) consisted mainly of the middle-class. Finally, the commuters' zone (5) was the suburban ring, consisting mostly of white-collar workers who could afford to live further from the CBD. This model was dynamic. As the city grow, the inner zones encroached on the outer ones.

Disadvantages:

- This model was developed for American cities and had limited applicability elsewhere.
- The model does not take into account any physical barriers and gentrification - which may occur in the cities.
- It does not address local urban politics and forces of globalization.

12.4.2 Sector Model

In the late 1930s, Homer Hoyt's sector model was published, partly as an answer to the drawbacks of Burgess' concentric zone model. This model was based both on urban land-use pattern and on demography. Hoyt accepted the existence of business district at the core, but suggested that various groups expand outward from the city centre along railroads, highways and other transportation arteries. As technology dealing with transportation and communication was improving, growth alone created more of a pie-shaped urban structure. Hoyt discovered that land rent (for residential, commercial, or industrial) could remain consistent all the way from the CBD to the city's outer edge.

Based on the above observation, Hoyt theorized the following:

- Cities tend to grow in wedge-shaped patterns—or sectors—emanating from the core business district and centered on major transportation routes.
- Higher levels of access meant higher land values; therefore, many commercial activities would be carried on in the central business districts, but manufacturing units would be developed in a wedge surrounding transportation routes.
- Residential areas would grow in a wedge-shaped pattern with a sector of low-income housing bordering manufacturing/industrial sectors (traffic, noise and pollution would make these areas least desirable), while middle and high income households would be located as far away as possible from manufacturing industrial units.

Disadvantages:

- The theory is based on nineteenth century transport and does not make allowances for private cars that enable commuting from cheaper land outside city boundaries. This occurred in Calgary in the 1930's when many near-slums were established outside the city but close to the termini of the street car lines. These

are now incorporated into the city boundary but are pockets of low cost housing in medium cost areas.

- No reference is given to out of town development.

12.4.3 Multiple Nuclei Model

In the 1940s, Chauncy Harris and Edward Ullman, arguing that neither of the earlier models adequately reflected city structure, proposed the multiple nuclei model. This model was based on the notion the CBD was losing its dominant position and primacy as the nucleus of the urban area. Several of the urban regions would have their own subsidiary but competing “nuclei.” As manufacturing cities became modern cities and modern cities became increasingly complex, these models became less and less accurate.

Today, there are urban realms, components of giant conurbations (connected urban areas) that function separately in certain ways but are linked together in a greater metropolitan sphere. In the early postwar period (1950s), rapid population diffusion to the outer suburbs created distant nuclei, but also reduced the volume and level, of interaction between the central city and these emerging suburban cities. By the 1970s, outer cities were becoming increasingly independent of the CBD to which these former suburbs had once been closely tied. Regional shopping centers (e.g., malls) in the suburban zone were becoming the new CBDs of the outer nuclei.

Advantages:

The advantages of this model lie in its multi nuclei approach - many sources give slight variants on the model shown in the diagram, since the model is rather flexible and adapts to local situations (the exact positions of the nuclei are not important but only the basic trends) so it can be modified to match the city under consideration.

Disadvantages:

- Negligence of height of buildings.
- Non-existence of abrupt divisions between zones.
- Each zone displays a significant degree of internal heterogeneity and not homogeneity.
- Unawareness of inertia forces.
- No consideration of influence of physical relief and government policy.
- The concepts may not be totally applicable to oriental cities with different cultural, economic and political backgrounds.

12.4.4 Urban Realm Model

Vance's urban realms model is an extension of the multiple-nuclei model and is based on the San Francisco Bay area but has been applied to other US cities. The key feature is the emergence of large self-sufficient urban areas, each focused on a center independent of the traditional downtown and central city. The area, shape and other characteristics of each realm depends upon the following several factors:

1. The terrain – mountains and rivers and other barriers will help to determine the extent and shape of a region.
2. The size of the metropolis – a larger metropolis may have more and larger realms.
3. The amount of economic activity within each realm – a determinant of the area it can serve and hence its size.
4. The transport infrastructure available within each realm – an easily accessible economic core increases the area of influence and thus size of each realm.

Transport infrastructure between realms – e.g. circumferential links (such as freeways) and airports such that people no longer have to travel to the CBD and its central realm in order to travel to other realms and to another metropolis. If a realm can become more important in this manner, then it may increase in importance. E.g. West Los Angeles is within easy reach of the LAX airport (along the freeway) but to travel by train residents have to travel to the CBD (by bus or car).

Advantages:

- If the city is successful, It can accommodate a large and growing population easily due to its automobile dependence.
- Each realm has its own economic strength, so overall the metropolis can be an economic powerhouse and can become some self-sufficient.

Disadvantages:

If a model fails, then the city displays a large amount of urban sprawl. Urban sprawl is the uncontrolled expansion of urban areas. Urban areas will expand into previously rural areas.

12.4.5 Central Place Theory

Central Place Theory (CPT) is an attempt to explain the spatial arrangement, size, and number of settlements. The theory was originally published in 1933 by a German geographer Walter Christaller who studied the settlement patterns in southern Germany. In the flat landscape of southern Germany Christaller noticed that towns of a certain size were roughly equidistant. By examining and defining the functions of the settlement structure and the size of the hinterland he found it possible to model the pattern of settlement locations using geometric shapes.

Advantages:

- The theory helps us understand the organization from a theoretical perspective and the spatial distribution.
- Important in Policy Making.

Disadvantages:

- The theory doesn't incorporate the temporal aspect in the development of central places.
- The theory is good for agricultural regions but not industrial or postindustrial regions.

12.4.6 A Model Best Suited for Guwahati

After studying above mentioned theories, following analysis has been conducted. It is evident that concentric zone model is not suitable for Guwahati as it was developed mostly for American cities and does not take into consideration any physical barrier or gentrification. Similarly, Sectoral model is also not applicable to GMPA as there is no allowances for private cars while considering the transportation sector. Additionally, it doesn't include any reference for the development which occurs immediately after town, which is the scenario in almost all Indian cities. In the case of urban realm model, if a model fails, then the city will start developing large amount of urban sprawl. This can't be applicable to Guwahati due to the absence of contiguous mass of land. Additionally, in today's context, a city should focus less urban sprawl as a city can't afford to lose its agricultural area. Central place theory is also not applicable to GMPA as it is good for agricultural regions.

Multiple Nuclei Model is best suited for Guwahati as it has a unique character of non-contiguous land mass. Additionally, the city has already developed a character where the application of this theory will become inevitable. The Major issues of the city can be solved with Multiple Nuclei Model.

Some of the issues include, the high-level congestion in the core town, increasing urban sprawl and decreasing agricultural land, haphazard development inside the planning area. Additionally, this model is flexible and can fit according to the local condition of a city/town. The other major reasons to adopt the Multi Nuclei Model in Guwahati region are listed below.

- Guwahati region is a noncontiguous settlement pattern paves the opportunity to develop the decentralization model.
- The administrative boundaries (noncontiguous settlement pattern) itself create the ways to decentralize the core activities from Central Business District.
- Guwahati being a gateway to northeast sharing major road network with Assam as well Sikkim, Arunachal, Meghalaya, Mizoram, Tripura and Manipur.
- Multi Nuclei model allows the even distribution of resources allocations.

12.5 Guiding Principles

The principles below further articulate the vision and are to guide planning of the proposed GMPA to achieve the foreseen vision.

12.5.1 Transit Oriented Development (TOD)

Transit oriented development is a mixed-use development integrating planning and implementations of transport and land use. Mixed-use developments include residential, commercial space and office space, or a combination of the same. Generally, mixed-use development is within easy access to transit corridors. Development within easy accessibility to the transit corridors encourages residents and workers to use public transit more often over private vehicles.

12.5.2 Urban Rural Continuum

Rural Urban Continuum is essentially the gradual change observed in terms of intensity of development from core city areas towards the peripheral area. The nature of settlement structure helps to understand the rural-urban dichotomy or continuity. In the initial stage, the change can be seen in form of changes in agricultural land use, in terms of high commercialization of agriculture activities. In the later stage, the change can be seen in occupational structure of the rural areas, in terms of when the rural population starts responding to possible employment opportunities in the surrounding urban areas. As time passes, the range of private enterprises would widen to include almost every type of enterprises sectors. Public transport would be the means of commutation, houses would be improved and better furnished; however, the basic amenities such as water supply, sewage disposal and drainage may not show any improvement. In the third and the last stage, changes in urban land use would be observed.

12.5.3 Multiple Nuclei Concept

Population of metropolitan area will grow along with a growth of the metropolitan area, and so the demand for the infrastructure too will grow. By creating, multiple nuclei centers will help reduce the burden of providing sufficient infrastructure from the metropolitan area. These nuclei centers can be identified based on the physical demarcation and accumulation of cluster of activities. They would not be the absolute population accumulation in a particular area but the service population with different size.

12.5.4 Urban Growth Boundary

Urban growth boundary circumscribes the possible urbanizable and developable area. Local governments would use the boundary as a guide to zoning and land use decisions. The local or regional government does not support development for a specified period beyond an officially adopted and mapped line. Growth is supported inside the boundary with utilities and development-friendly policies. Growth is discouraged outside the growth boundary. The purpose of providing urban growth boundary is to synchronize existing urban growth with the provision of infrastructure needed to accommodate future growth, and to promote compact and contiguous development patterns that can be effectively served by public services; as well as to preserve open space, agricultural land, and environmentally sensitive areas that are not currently suitable for urban development.

12.5.5 Peri Urban Development

UNDP (1996) defines peri-urban as an activity that produces processes and markets food and other products, applying intensive production methods and reusing natural resources and urban wastes to yield a diversity of crops and livestock. Peri urban in addition can also involve animal husbandry, aquaculture, agro-forestry and horticulture.

12.5.6 Provision of Socio-Physical Amenities

URDPFI guidelines will be base line for foreseeing the socio-physical amenities requirement for the horizon year 2045.

12.6 Conceptual Plan Development

To achieve the vision and goals set for the planning area it is critical to have a concept, which illustrates the long-term direction guided by planning principles.

Several considerations were taken into account while formulating the concept for the planning area, which are listed below.

Socio-demographic Projections

- Current Growth Trends
- Level of Urbanization
- Stakeholder Meeting Suggestions
- Suggestions from various Government Organization, NGOs etc.
- Existing Physical & Social Infrastructure

- Existing Land Use Analysis & Land Availability for Future Development
- Economy of planning area
- Govt. Policies & Future Projects

Based on the various analysis and exploration the nodal points are identified for the projected year 2045. The figure 12-2 reveals that the identification of Growth Centers, Growth Points and location for the Multi Modal Logistic park in Guwahati region. They are detailed in the table 12-1.

Table 12-1 Details of Development Centres and Nodal Points

Multi Nuclei Model Guwahati Planning Area- 2045			
Sr.No.	Development Centre	Nodal Point	
1.	Growth Centre	North Guwahati	Jalah
		Sualkuchi	Kamargaon
2.	Growth Point	Changsari	Ahom Gaon
		Amingaon	Bonda Gaon
		Singimari	Dharapur
3.	Transit Hub	Numati Jalah	
		Azara	
		Khanapara	

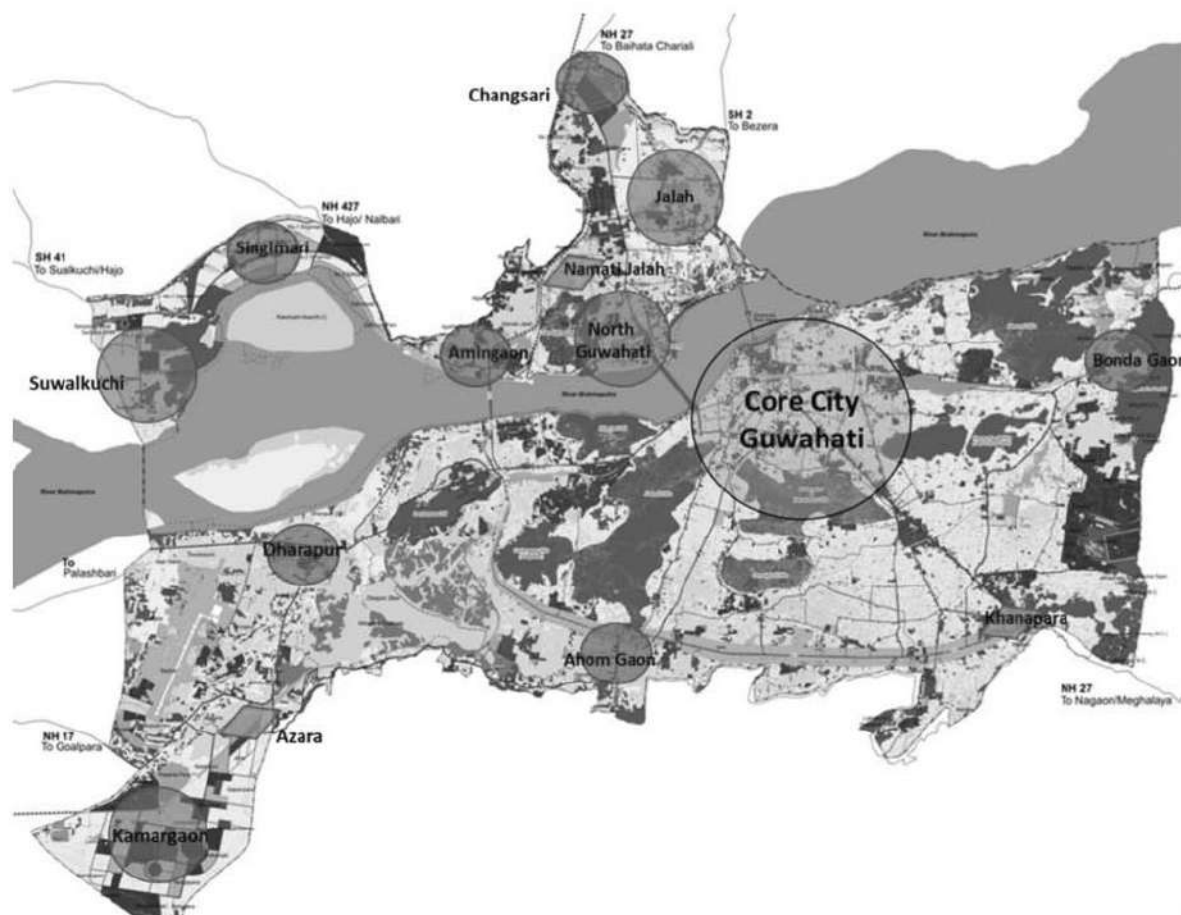


Figure 12-2 Concept Plan for Guwahati Master Plan Area - 2045

The planning area currently accommodates 11.41 lakhs of population with a gross density of 34 persons per hectare and this population is projected to grow to almost 38 Lakhs by 2045. The planning area have certain inherited nodes like the Institutional area, Industrial area, Municipal areas & its Outgrowth and the rural hinterland. For ease of planning, the Guwahati Planning Area is divided into three zones as mentioned above.

12.6.1 Conurbation Area

Conurbation area is a continuous urban area comprising of towns and their outgrowths merged with each other due to physical expansion and population growth. In the case of Guwahati, Existing Conurbation area includes Guwahati Municipal Corporation, 8 Census Towns (Changsmari, Jalah, Amingaon, Bamun Saulkuchi, Kahi Kuchi, Garal, Azara, Dharapur) and 1 Outgrowth area (Narengi). The continuous development has occurred up to Lokhara, Basistha and Baragon Village due to existence of NH 27 on Southern side of Guwahati. The continuous development also has occurred due to Goalpara and Palashbari Road in Dharapur, Azara, Mirzapur and Kahikuchi village on South-West part of Guwahati. This area is also well connected through NH-17. Moreover, In North Guwahati, the development occurred after establishment of Saraighat Bridge and development of NH 27. The towns benefited are North Guwahati, Amin Gaon, Jalah, Gauripur and Changsari. The villages included in the proposed conurbation area are listed below.

Table 12-2 Proposed Conurbation Area 2045

Proposed Conurbation Area - 2045				
Sl. No.	GMC+NMB + OG	CTs	CTs	Villages
1	Guwahati Municipal Are	Changsmari,	Garal	Shila
2	North Guwahati Municipal Are	Jalah	Azara	Rudreshwar
3	Narengi	Amingaon	Dharapur	Gauripur
4		Bamun Saulkuchi		Rangmahal
5		Kahi Kuchi		Abhaipur
6				Tiling Gaon,
7				Namati Jalah
	3	5	3	7
Total no. of villages covered within Proposed Conurbation Area				18

(Source: Consultant Compilation)

12.6.2 Planning Concepts

It is essential for any Comprehensive Master Plan to adopt the appropriate planning concept before arriving at the proposed land use Map for the city. The planning concepts are the drivers to solve the existing issues of the city and also paves the way for positive development in the system. The city will be developed over the period to achieve the goals and vision framed under the Comprehensive Master Plan. Based on the guiding principle of the planning concept and navigate towards achieving, the key planning concepts adopted are decentralization, densification and planning interventions.

12.6.2.1 Decentralization

The word "decentralization" can carry a variety of concepts like financial, administrative, service delivery or activities decentralization. It is the process of redistribution of administrative, economic and urban functions away from a central or congested area into the areas having potential for development. It is very much essential when the CBD becomes saturated, quality of life starts deteriorating and room for further development is low. By considering these points there is need to analyze the present situation of the core areas of the Guwahati Planning Area in order to understand the potential problems of traffic congestion in and out of core areas during peak hours.



Table 12-3 Guwahati Core city area land use cover

The core area of Guwahati viz. Fancy Bazar, Pan Bazar, Paltan Bazar, Uzan Bazar and surrounding areas, being heart and soul of Guwahati district, has emerged as one of the most congested area due to concentration of large number of commercial activities, public facilities, administrative offices and population leading to high degree of congestion. The mixed-use development is reflected in the land use plan are presented in the figure 12-3. It has also been evident that the density of commercial and public & semi-public use is much higher in the CBD area compared to the rest of the planning area. In order to tackle the over dependency of Core city area for commercial and public purposes like recreation and education. There is urgent need to have a long term strategy to decentralize the commercial activities to other centers identified across the planning area. By way of distributing the commercial activities along with public activities to these centers will bring jobs and shopping needs closer to the homes of the majority of the population, which leads to reduced travel time into the core areas, reduce peak hour congestions as well as vehicular emissions. Decentralization can bring in new economic development in these centers making them more affordable for business locations. This also supports the Sustainable Regional Planning Framework formulated for the region and the proposals given in Comprehensive Mobility Plan for Guwahati.

Thus, the Guwahati Master Plan 2045 aims to decongest the city core through well-defined strategies by introduction of open spaces and decentralization of commercial activities and also to maintain the existing profile & inherent heritage. Decentralization of some major activities like the wholesale market, commercial centers will open up land parcels for other uses like recreational use which are inadequate in the core area. Majority of the commercial activities like street vending, weekly markets, hotels, retail shopping etc. are concentrated in and around the Guwahati town.

Therefore, it is very much essential to distribute these activities across planning area. Keeping this in mind after detailed study and through investigation four growth centers were identified in the system i.e.,

1. North Guwahati
2. Jalah
3. Suwalkuchi
4. Kamar Gaon

Further four growth points were analyzed in order to promote hinterland which support growth centers.

1. Bonda
2. Ahom Gaon
3. Dharapur
4. Amingaon
5. Changsari
6. Singimari

The location of all the growth centers and growth points across the Guwahati planning area are presented in the figure 12.2. The commercial, public semipublic land uses are proposed across all the identified growth centers and growth points in order to reduce the congestion in the Guwahati town and to create employment opportunities near to residential communities. These growth centers and growth points are identified based on the long-term strategy to distribute the growth and development across the study area to promote multiple urban centers within the planning area. This will encourage sustainable option for transportation and reduce trip generation to the already congested area. While choosing the growth centers due care was taken to give priority for areas that are served with better connectivity in the proposed Master Plan and their proximity to potential Multi Modal Transit Centers. Thus, making them suitable for relocating commercial activities along with public and semi-public use which will enable easy access to the public. Decentralization also avoid agglomeration of economies in the CBD areas and reduces commuting cost by optimal spatial distribution of the employment centers within the planning area. Through redistribution of commercial and other uses towards the growth centers would increase the revenue for the urban local bodies in the system. Further it is also to be highlighted that the study area (Guwahati region) is not contiguous. Therefore, the conventional planning theories and techniques could not be employed in the system. In view of the location specific phenomenon, the optimal regional concept has been chosen and the same is here justified to adopt growth pole theory Multinuclei concept on the system.

12.6.2.2 *Densification*

Urban densification is widely considered as a sustainable urban policy to create some sort of compaction process to attain more sustainable urban development. It differs widely from the private transport oriented urban sprawl which is observed in many India cities which leads to the following undesired characters for the planning area: -

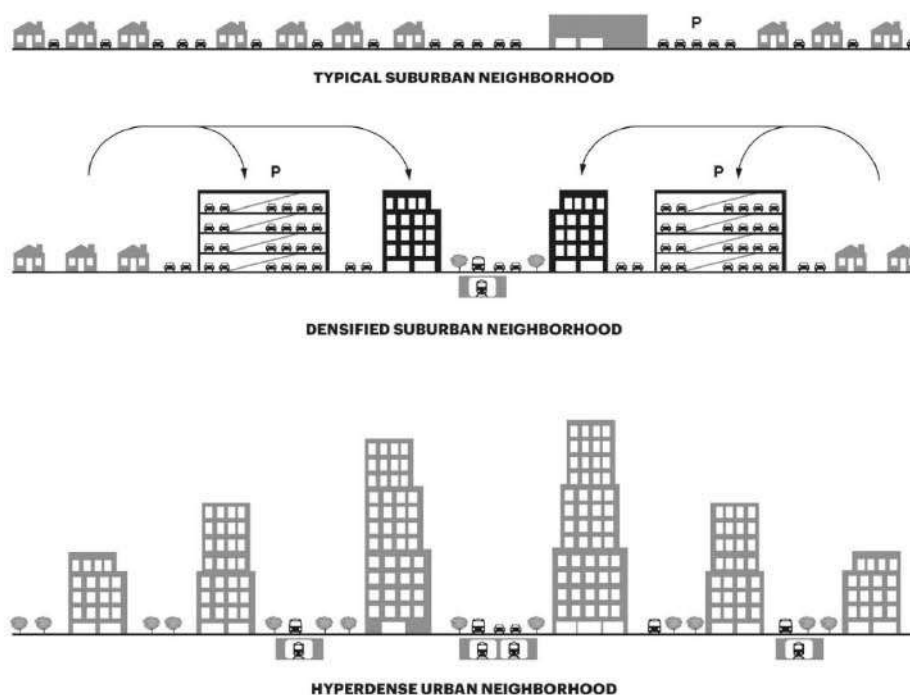


Figure 12-3 Dincification concept for TOD neighbourhoods

Longer distance between urban functions like residence, employment centers, commercial centers, recreational facilities etc.

- a) Loss of open land and agricultural land to speculative developments
- b) Social segregation and class based divide
- c) Inadequate infrastructure
- d) Poor access to services and facilities

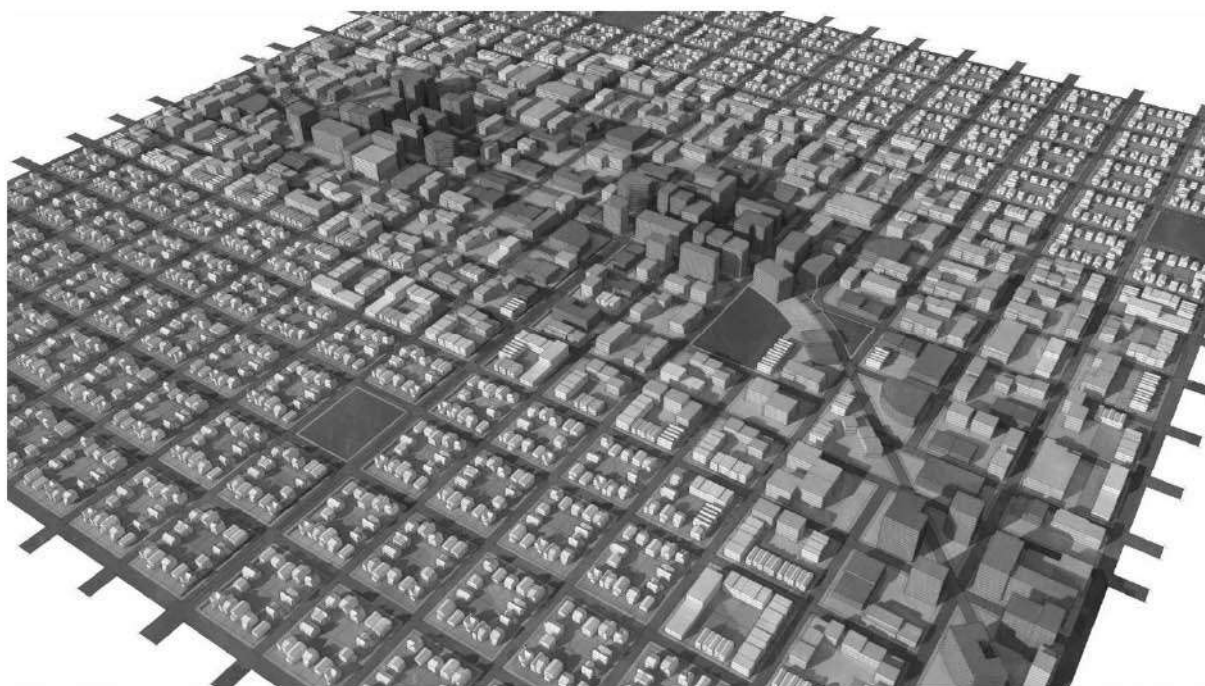


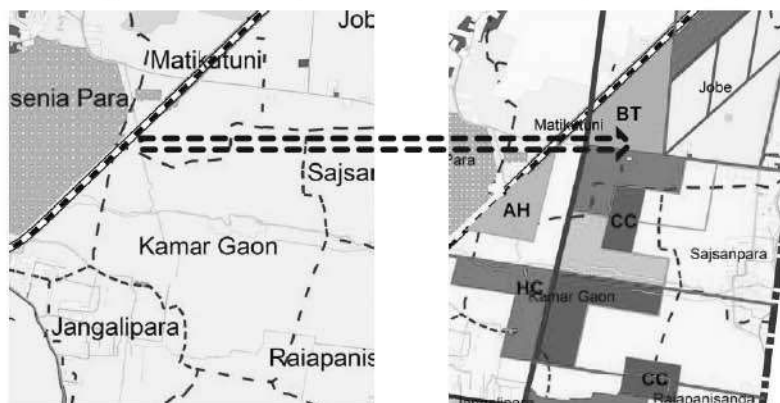
Figure 12-4 High, Medium and Low density development around Mass Transit Corridor

If left unattended the urban area within the planning area will expand to such a degree that they become unmanageable and inefficient in terms of services delivery. Keeping aforementioned points in mind it's important to adopt the densification policy which is in relevance with the national level policies of spatial planning and transit-oriented planning directing cities to adopt densification along transit corridors and zones which are already well served with all kind of infrastructure. Densification emphasis the inter-relationship between spatial planning, infrastructures, in particular transportation infrastructure. The principle behind this planning concept is that the densification will lead to residential development and infill developments to be more viable due to minimum spending on infrastructure and proper circulation network already exists in the system. Densification is the increased use of space vertically, so as to accommodate more people in a certain geographical area which results to increase population density as well as Dwelling Unit Density. Densification or urban compaction typically involves consolidation of activities and uses and strategic densification of residential locations. The primary objective of densification is to reduce the commuting distance, which will in turn result in walkable friendly area, less travel distance reduces energy consumption and finally minimum environmental pollution. The area on the both the sides of major arterial/district roads are densified to prevent the urban sprawl, which is currently taking place in Guwahati.

It is one of the methods of Sustainable Landuse Planning through TOD. Moreover, the entire proposed conurbation area is proposed to be densified to accommodate more people inside conurbation area.

12.6.2.3 *Planning Interventions*

The planning interventions has to be proposed for key land use categories in order to prevent haphazard development. Currently, lot of urban sprawl has happened inside the planning area away from the city, which creates huge task to provide adequate



infrastructure to the sprawled development. Therefore, under Master Plan 2045, proposals have been framed in a way that will limit the growth to certain limit. Considering that, the major commercial activities are proposed in dedicated commercial and mixed-use residential zone corridors. The high-density residential areas, commercial areas and other public & semi-public areas are proposed near major transportation nodes, such as Multi modal transit centers, bus stands etc. to minimize the travel distance. Major recreational areas are proposed in close vicinity to the major residential areas. Moreover, the proposals have made sure that all the residential areas are having adequate amenities.

12.6.3 Rural Area and Growth Centres

The formation mainly happens when the CBD gets saturated with developmental activities and there is hardly any room for further development. Thus, it demonstrates the complex nature of urban areas. In the light of this, four Growth Centers and six Growth Points are identified in Guwahati Planning Area since there is a dire need to decentralize the commercial/public semi-public activities towards outskirts of the urban area. Four Growth Centers are proposed in North Guwahati, Jalah, Suwalkuchi and

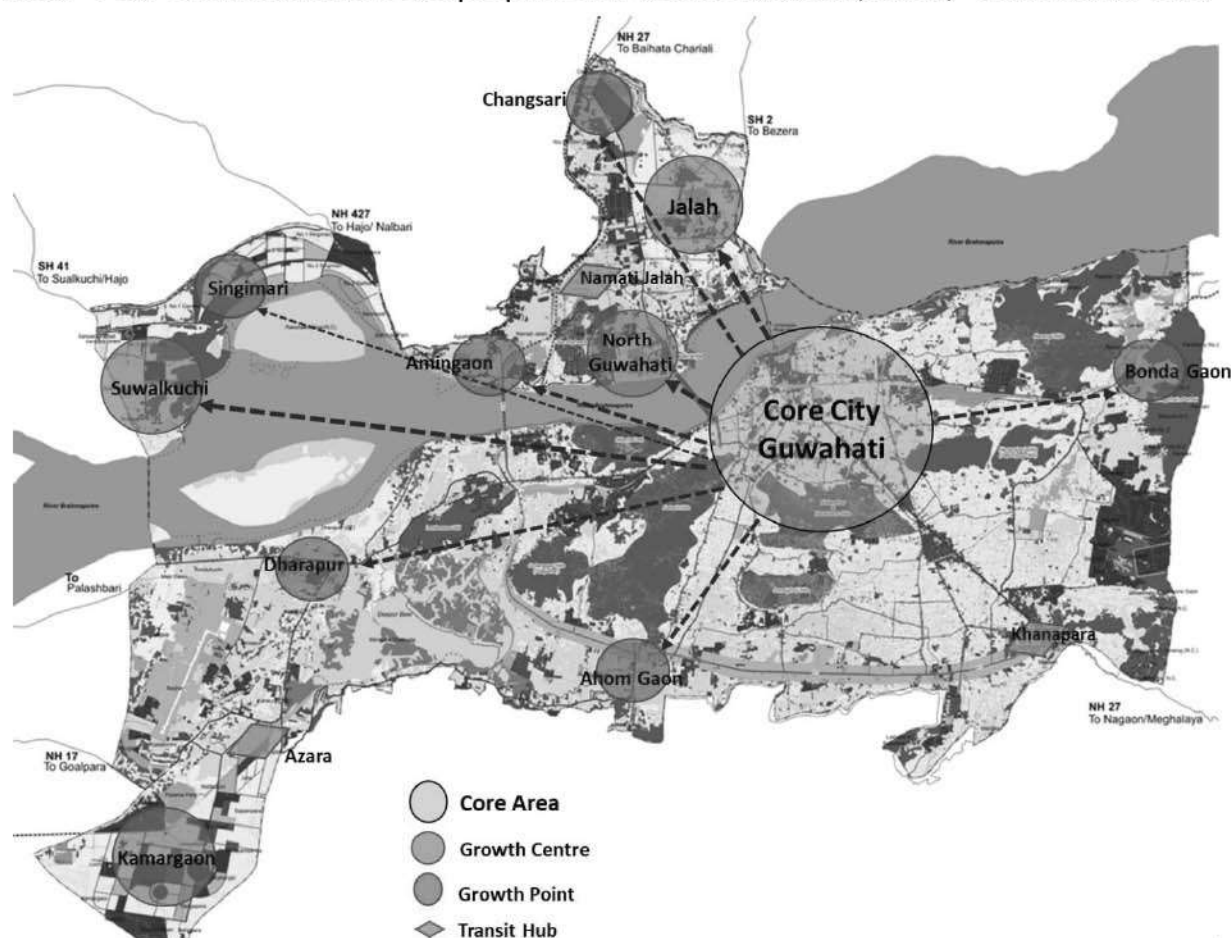


Figure 12-5 Concept Plan for Guwahati Planning Area 2045

Kamargaon the Growth points are proposed in Bonda, Ahom Gaon, Dharapur, Amingaon and Changsari.

12.6.3.1 *North Guwahati Growth Centre*

North Guwahati, located in the Northern side of Brahmaputra River of planning area, is known as the Institutional Hub of the area and has very significant institutes like IIT Guwahati and Administrative and Govt. institutions in the region. North Guwahati is individual Municipal Board consisting of 4 wards in its region. Thus, development of this prime location is necessary for preserving the institutional character of land and to increase the employment opportunities in tertiary sector. Moreover, development of the big chunk of flat land will enhance the overall educational and institutional character of the GMPA. Thus, North Guwahati and nearby villages are proposed as an institutional growth centre. Other reasons stating the potential of North Guwahati commune to be developed as a growth centre are mentioned below:

- North Guwahati is situated almost 15 Km from core Guwahati city via AT road and SH-2. These roads have ribbon development and potential to develop. North Guwahati and surrounding villages are also well connected by Newly developed National Highway known as NH 27 Road.
- The presence of IIT Guwahati connecting SH 2 and NH 27 will increase the scope of all round development of region as self-dependent unique entity reflecting institutional character of region.
- Since the GMPA is Non-contiguous area, it is essential to focus on North Guwahati centre as self-sustainable development to the extent which will reduce the generation of trips from North Guwahati to Guwahati every day.
- Moreover, the proposed Educational Institutions, Commercial, Industrial and Residential centres in North Guwahati and proposed village will accelerate the scope of North Guwahati to function self-sufficiently.
- The proposal of Sports Complex facilities and Student friendly infrastructures like Hostel facilities, Library, Public Transport System, Road networks consisting separate bicycle tracks will Pull the population from the nearby region which will further strengthen the development.
- Agricultural and Open land in surrounding villages of will act as green zone for North Guwahati Growth Centre.

- North Guwahati will have the impact of proposed ring road and Guwahati bypass Highway 27.

12.6.3.2 *Jalah Growth Centre*

- North Guwahati is situated around 22 km from Guwahati city centre via NH 27 where Brahmaputra Industrial Park and Small to Medium scale industries are functional.
- Development of Jalah as Multi Nuclei / Self sustainable center may reduce the traffic flow to Guwahati town.
- The presence of already existing industries will attract a greater number of industries. Tool based industries are proposed to be strengthened by capacity building programs.
- Apart from this, Jalah is also well connected by NH 27 and Intermediate Ring Road corridor which will attract and boost the development in the surrounding area. Goods and Freight travelling from North Assam and Surrounding States to Guwahati can interchange the mode of transport from Jalah Bus Station Station and near by railway station .
- Existing Railway line is also passing from the West-Easter side of the Jalah. The Growth centre can take an advantage of this connectivity as well. The existing Athgaon Railway Station over this route will be an important mode of regional transport between North Guwahati and Jalah. The goods and Fright can be utilized for Industrial development purpose. Due to this connectivity, the Growth centre will be further flourished in terms of development.

12.6.3.3 *Sualkuchi Growth Centre*

Sualkuchi town located, 35 km far from Guwahati, in the North- West side of planning area is known for its large number of cottage industry engaged in handloom, for which it is also known as the "Manchester of Assam". This is the textile center of Assam. Muga silk and Pat silk along with Eri silk and Endi cloth from this region is famous for its quality. Mekhela chadors and Gamosa made from these indigenous materials is in demand throughout Assam as well as other parts of India. Thus, development of this prime cottage industry is necessary to increase the employment opportunities in tertiary sector. Moreover, to boost the character of the town it is important to make the town self-sufficient and less dependent on Guwahati for daily need. Thus, Sualkuchi

is proposed as an economic growth centre. Other reasons stating the potential of Sualkuchi commune to be developed as a growth center are mentioned below:

- Chengkuri Grant is 35 km from City Centre and village area are consisting beautiful river side area with well-developed crop land. These village is situated along the Brahmaputra river, hence there is huge scope for river front development for tourism and recreational are for upcoming settlements.
- Since the town has good connectivity through SH 41 and Guwahati NH27, a commercial zone may be proposed along the stretch of 30mt road nearby village.

12.6.3.3 *Kamar Gaon Growth Centre*

Kamargaon is situated around 26 km from Guwahati core city via NH 17 and closer to Borjar town it has got its own potential to develop by consisting LGBI Airport nearby. Development of Kamargaon as Multi Nuclei / Self sustainable center may reduce the traffic flow to Guwahati and North Guwahati. Kamargaon, located in the South-west side of planning area, is known for agriculture activity of the area. Around 54% of the working population is dependent on primary sectors for their economy generation. Thus, it is proposed to be developed as an agricultural hub where agricultural activities are promoted and sufficient commercial areas are proposed to facilitate agricultural allied activities. Other reasons stating the potential of Kamargaon commune to be developed as a growth center are mentioned below:

- Majority of the area in this commune falls under agriculture category and the residents are dependent on primary sector for economy generation.
- In consideration of this aspect, Kamargaon has been proposed as agricultural Growth Centre where agriculture and its allied activities will be promoted.
- The connectivity with NH 17 will accelerate the scope of development for this area.
- Eco village tourism is proposed here as the existing character of the area has the potential to be developed as an Eco village tourism. Moreover, this will act as a livelihood option for the residents of the area.

12.6.4 Growth Points

The selected points will produce self-sustaining growth. In Guwahati Planning Area, three growth points have been identified viz. Changsari, Amingaon, Singimari, Dharapur, Ahomgaon and Bonda gaon.

12.6.4.1 Changsari Growth point

Balighat Growth Point which is located on the North most side of the planning area, has the proximity to North guawahti Town. It is connected to Guwahati by NH – 27. Changsari is having potential to grow as self-sustaining village as it consists states most reputed Medical Institution AIMS and enough open land that can be developed for future needs. Thus, it is proposed as a growth point. In this area, activities supporting the educational institutes will be developed. Existing character of industrial development in surrounding will also boos the economy of the centre.

12.6.4.2 Amingaon Growth point

Amingaon Growth Point which is located on the North side of the planning area, has the proximity to Guwahati Bypass NH-27 through NH 427. The area consists majorly Government institutions and potential to become a public place for future neighbourhood. Its proximity to the proposed industrial corridor enables this area with great potential to grow as a growth point attracting investments and being a node for services for the surrounding areas. River side development is proposed in the Brahmaputra to attract the tourists and this will reduce the burden of the Guwahati riverfront.

12.6.4.3 Dharapur Growth point

Dharapur Growth Point which is located on the western side of the planning area, located on NH-17 distancing 20 km from City Centre. Dharapur being a nodal point for connectivity from Goalpara and Palashbari possesses potential for commercial and mixed use development along arterial road. Being a river side town possess good scop of tourism plus public space development. Availability of land and future population growth requirements encourage the surrounding area to be developed as an institutional for addressing the institutional land requirement to suffice the educational and employment opportunities required for the future population. The strong connectivity with LGBI Airport will also facilitate the development of industries, as it will provide ease of transportation of goods to adjoining state.

12.7 Rational for the Contiguous Urban Developable Area

In addition to the regional connectivity of the GMPA with the rest of the seven sister states and the country, existing settlement pattern and urban growth in and around the Guwahati city, location of eco-sensitive areas and existing land use have to be taken into consideration while developing concept plan for the proposed GMPA.

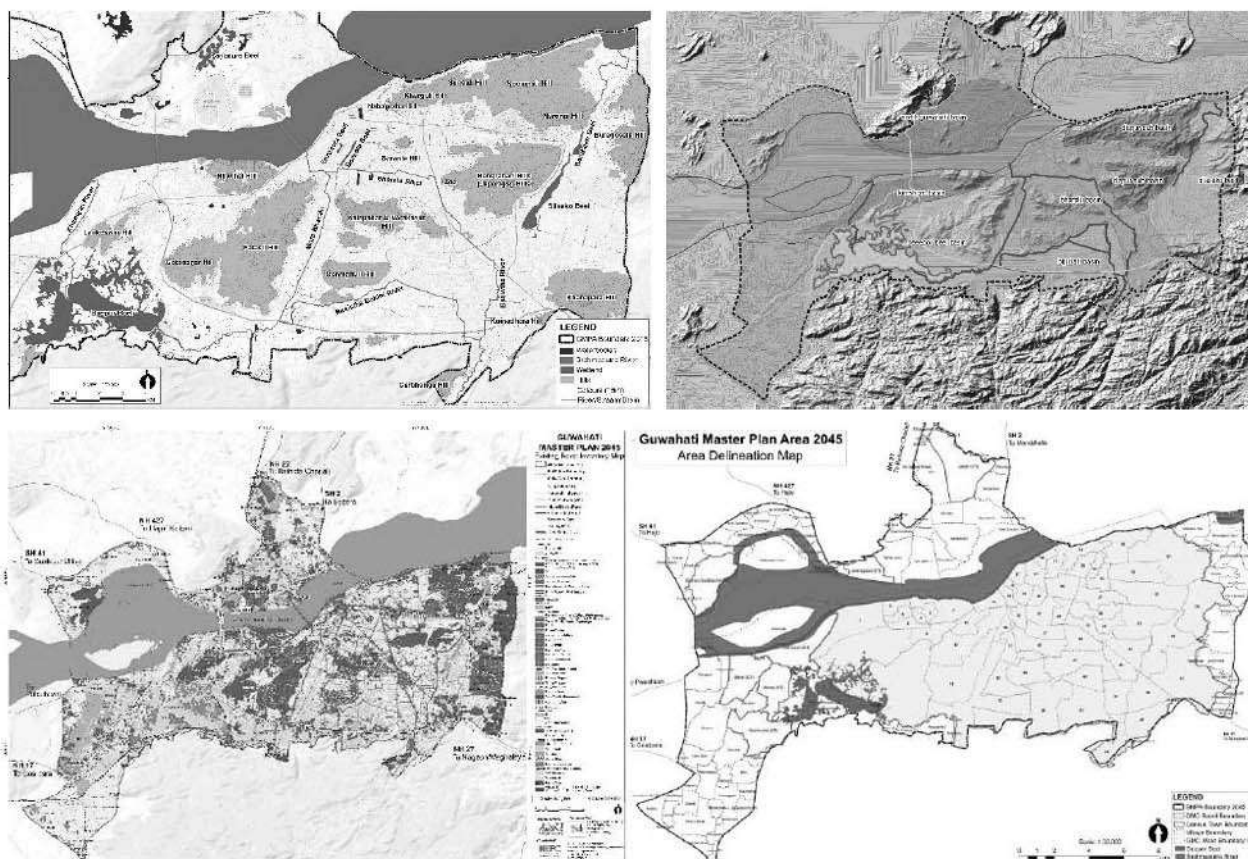


Figure 12-6 Physiography and Water Basin within GMPA

12.7.1 Transportation Axis and Growth Pattern:

Strategic location of the Guwahati city makes it the regional center of the northeast region of the country. Number of nation highways that are spread across the Assam State; connect Guwahati with the other states of northeast, as well as to the remaining India. In fact, over the last two decades, visibly urban growth has been observed along the transport axis. In addition, location of the airport and the railway stations have influenced the growth pattern of the region. Hence, road network, rail network and location of airport is taken in the consideration while developing the alternatives for the Contiguous Urban Developable Area.

Road connectivity has enhanced the urban development of GMDA and its surrounding areas. There has been visible growth observed in the south-west direction along the

NH-27, towards north along NH-427, in the south towards Meghalaya along NH-27 and towards Jagiroad to some extent. Numbers of new urban centers have gradually emerged along these transportation corridors. In fact, number of urban areas has increased from 7 in 1991 to 10 in 2001, to 30 in 2011 (including Narengi outgrowth). The maximum growth in the urban centers has been observed in the areas situated on the west of the existing boundary of GMDA area, especially in Palasbari RC, along the NH 37 corridor. 8 villages have been identified as census towns in this area between Census years 2001 to 2011; while 3 newly emerged urban areas have been classified on the east of the city along the NH 37 corridor. Addition to these, in N. Guwahati RC, two new urban areas have been mapped along the transportation corridors.

In addition, the functional interdependency of the first order and second order urban settlements on the Guwahati city is also taken in the consideration, while developing the alternatives for the proposed Contiguous Urban Developable Area.

12.7.2 Eco-Sensitive Area and Existing Land Use:

Other than the urban centers, pattern of the rural settlements in the region is also taken in the consideration, along with the existing economic nodes and eco-sensitive areas. Eco sensitive area, such as forest, wetlands, and waterbodies have also taken in the consideration while developing the alternatives for the Contiguous Urban Developable Area.

12.8 Alternatives for Contiguous Urban Developable Area

Overlaying the existing development pattern with the transportation axis, layer of eco-sensitive areas, and with the existing land use pattern in the region, following options were worked out. Here, presented all the possible alternatives for future urban developable area. Recommendations and objections suggested by the authority have later incorporated in the final concept plan, presented at the end of this chapter. In addition, four gross density alternatives were also developed to exercise the proposed urban developable area. As per URDPFI guidelines, ideal density for urban developable area in hilly region should be 60-90 pph (person per hectare). Considering this guideline, the urban developable area should be comprised around between 800 sq.km to 1,000sq.km.

Table 12-4 Optional Gross density of Developable area

2045 Population		38,63,812
Alternative-1: 30 pph Density		
Req. Area (sq.km)		1287.93
Alternative-2: 40 pph Density		
Req. Area (sq.km)		965.95
Alternative-3: 50 pph Density		
Req. Area (sq.km)		772.76
Alternative-4: 60 pph Density		
Req. Area (sq.km)		643.96
GMPA 2045 Area (sq.km)		328
Gross Density (pph)		117.79
UDPFI	Guideline	Recommended
Density		60-90

12.9 Guidelines and Criteria Consideration

All the above considerations would ensure in the future GMPA a planned spatial structure of the urban settlements and their functional interdependency with each other. Proper zonation and prioritizing the fragile ecology area with least development activities in terms of extensive usage of land including recreational and low-density zone would ensure a balance between developable and open spaces. The transportation axis in the area is also a major consideration, which will help facilitate the region in improving inter and intra connectivity. The final concept plan for the urbanization area of the GMPA hereby have been conceptualized with the approach that other towns around GMC would be developed as Growth Centre and Growth Point within the GMPA. Under AMRUT Mission, 328 sq.km of the proposed GMPA with 93.64 sq.km of the contiguous urban developable area has been selected.

Table 12-5 Existing Landuse Distribution

Sr. No.	Landuse Type	Area (Sq Km)	Percentage of Developed Area (%)	Percentage of Planning Area (%)
1	Residential	86.40	63.97	25.61
2	Commercial	6.40	4.87	1.95
3	Industrial	5.75	4.38	1.75
4	Mixed	2.72	2.07	0.83
5	Public and Semi Public	22.98	16.85	6.75
6	Public Utilities	0.76	0.58	0.23
7	Recreational	2.22	1.69	0.68
8	Transportation	17.64	5.59	2.24
Total (Developed Land)		144.87	100	44.16

9	Vacant	43.70	13.32
10	Agricultural	42.20	12.87
11	Hills and R.F.	57.70	18.67
12	Barren Land	7.74	4.09
13	Eco-Friendly	5.8	1.77
13	Waterbody	16.46	6.10
14	Wetlands	8	2.44
15	Aquaculture	1.53	0.43
Total (Undeveloped Land)		183.13	55.83
Grand Total		328.00	100

Out of total GMPA area, 93.64 sq.km area is the Contiguous Urban Developable Area, which is around 28.54% of the total GMPA area. Out of total Urban undeveloped Area, which is 183.13 sq.km (55.83%) total 89.49 sq.km (27.28%) area is non-developable area that comprise Tree clad, Waterbodies, Wetlands, Aquaculture, Hillocks, and Reserved Forest, while rest of the 28.54% area is available for urban development. Hence, overall, 93.64 sq.km of land is available for development under Guwahati Planning Area 2045.

12.9.1 Criteria taken in Consideration for Proposed Land Use Distribution

URDPFI guidelines for the land use distribution (within urban developable area) are taken in consideration for the land use distributions in the GMPA. Apart from the URDPFI guidelines, residential area requirement for housing provision based on the 1.5 FSI (Floor Space Index) and commercial and industrial area requirement based on the employment projection are also taken into the considerations.

12.9.2 Guidelines for Land Use Distribution

Following table presented the recommendation for land use distribution within the urban developable area by URDPFI Guidelines. The table also show the proposed land use distribution within the proposed urban developable area.

Table 12-6 Guidelines for Land Use Distribution

Land use Categories	Recommended Share of Land Use (in percentage of Developable Area)
<i>Residential</i>	45-50
<i>Commercial / Mixed Use</i>	4-5
<i>Manufacturing/ Industries</i>	5-7
<i>Public and Semi-Public</i>	12-15
<i>Open Space Zone/ Recreation</i>	16-20

<i>Transportation & Communications</i>	<i>6-8</i>
<i>Agriculture, Water Bodies and Special Areas</i>	<i>Balanced</i>
Total	100
<i>(Source: URDPFI Guidelines)</i>	

12.9.2.1 Residential Area Requirement Based on Housing Demand

As per the housing projection (refer chapter-6), the GMPA would be required total 7,49,476 housing by 2045. Based on the consideration of 200 sq.mt/housing unit and 1.5 FSI (Floor Space Index), with 25% circulations, and 50% ground coverage, around 187.36 sq.km of additional residential land is required to accommodate the 676 thousand houses within the urban developable area of the proposed GMPA. Overall, around 272.36 sq.km of land will be required for residential settlement in the Planning Area by year 2045. Considering the contiguous area covered by hills, wetlands, water body, agriculture land, eco sensitive area, the proposed residential area is restricted up to 93 sq.km developable area and that to not only for residential purpose. Further Residential cover could be proposed in Phase 2 Planning of GMPA.

Table 12-7 Residential Area Requirement Based on Housing Demand

Criteria	Year 2045
Total No. of Houses Required	749476
Area Per Housing Unit (sq. meter)	200
Total Residential Unit Area (on sq. meter)	149895200
Assumed Additional 25% Circulation Area Required per unit	
Total Gross Area (Total Residential Plot/Area) (sq.mt)	187369000
Allowed FSI / Average FSI as per GDCR	1.5
Net Area Residential Requirement at Plot Level	124912666
Required Residential Area (sq.km)	124.91
Required Residential Area (ha)	12491
Assumed Allowed (as per GDCR) 50% is Ground Coverage for road and other circulation at city level	
Gross Residential Land Requirement (DMPA Level) (sq.mt)	187369000
Required Total Gross Residential Area in DMPA (sq.km)	187.36
Required Additional Residential Area (ha)	18736

12.9.3 Criteria taken in Consideration for Land Use Proposals

Based on the land suitability and potential analysis, existing land use pattern, and existing situation following criteria were considered while developing land use proposals for the GMPA, especially within the contiguous urban developable area:

- As the region is blessed with Brahmaputra River and its tributaries and eco-sensitive area, the area surrounding them should be kept conserve and no or low intensity development should be allowed. No-development buffer varying from 9 meter to 50 meter should be kept surrounding river and wetlands.
- As far as possible low intensity of residential development should be considered in the area that is in the close proximity of the eco- friendly areas.
- Based on the existing land use pattern, high intensity of mixed use development along the major roads should be considered.
- Transport zone or transport related activities should be kept nearby transport facilities such as Interstate Highway.
- Road network should be designed to have a proper road circulation throughout the Master Plan area, with road hierarchy to provide free movement and to reduce congestion from the existing roads.

12.10 Proposed Land Use Plan

The total project area includes GMC and existing GMDA Area to make Guwahati Master Plan Area. Area other than settlements and developmental activities, such as open land (waste land, open / vacant land), wet lands (used for recreational development), Tree covers can be foreseen based on development potential, feasibility, suitability, and consultation with stakeholders.

12.10.1 Proposed Land Use Distribution

Considering all above mentioned criteria, below mentioned land use distribution has been proposed. The proposed land use map allocate 30.40% for residential, 2.09% land for commercial and mixed use development, 1.86 % land for industrial development, 9.92% for Public and Semi Public, and 11.70% land for open space and recreational purposes out of total developable area. Total 25.89% area will remain undeveloped for the reserved forest, tree clad, water body, wetlands, active flood plain area and hills within GMPA.

Table 12-8 Existing and Proposed Land Use Distribution of GMPA 2045

Sr. No.	Landuse Category	Existing - 2020			Proposed - 2045		
		Area (Sq Km)	% age of Developed Area	% age of Planning Area	Area (Sq Km)	% age of Developable Area	% age of Planning Area
1	Residential	86.40	63.97	25.61	99.71	41.02	30.40
2	Commercial	6.40	4.87	1.95	6.87	2.83	2.09
3	Industrial	5.75	4.38	1.75	6.11	2.51	1.86
4	Mixed	2.72	2.07	0.83	24.82	10.21	7.57
5	Public and Semi Public	22.98	16.85	6.75	32.53	13.38	9.92
7	Recreational	2.22	1.69	0.68	38.37	15.78	11.70
8	Transportation	17.64	5.59	2.24	34.68	14.27	10.57
Total (Developed Land)		144.87	100	44.16	243.09	100	74.11
Conservation-1					64.9		19.78
9	Reserved Forest				24.08		7.34
10	Landslide prone area				3.59		1.09
11	Waterbody				16.13		4.92
12	Active Flood Plain Area	183.13		55.83	13.6		4.15
13	Wetlands				7.5		2.29
Conservation-2					20.01		6.12
14	Hills				20.1		6.12
Total (Protected Land)		183.13		55.83	84.91		25.89
Grand Total		328.00		100	328.00		100

12.10.1.1 Residential Use

For the projected residential population of 38 lakh persons, the total area required by 2045 for urban development is forecasted to be 18736 hectares, out of which 9971 hectares are earmarked for residential development against 8640 hectares available at present. The dedicated area for affordable housing for economical weaker sections is separately identified in the proposed land use plan 2045.

12.10.1.2 Commercial Use

Commercial use has been dedicated to 283 hectares for the projected year 2045 from the existing 640 hectares which contributes about 2.83 % and 2.09 % of the developed area and the total planning area respectively. As the population increases the demand for commercial area increases, hence commercial areas has been planned at the major junction nodes.

12.10.1.3 Mixed Use

Mixed use has been limited to 611 hectares for the projected year 2045 from the existing 272 hectares which contributes about 10.21 % and 7.75% of the developed area and the total planning area respectively. As the population increases the demand for mixed use area increases, hence mixed use areas has been planned along all the higher level roads.

12.10.1.4 Industrial Use

Industrial use has been increased to 1111 hectares for the projected year 2045 from the existing 575 hectares which contributes about 2.51 % and 1.86 % of the developed area and the total planning area respectively.

12.10.1.5 Public and Semi-Public Use

Public and Semi-Public Use has been increased to 3253 hectares for the projected year 2045 from the existing 2298 hectares contributing about 13.38 % and 9.92 % of the developed area and the total planning area respectively.

12.10.1.6 Recreational Use

Recreational use has been increased to 3837 hectares for the projected year 2045 from the existing 222 hectares.

12.10.1.7 Transportation Use

Area under Transportation use has been increased to 3468 hectares for the projected year 2045.

12.11 Facility Centre

Based on the hierarchy of order of settlements, facilities are planned. The following are the levels based on hierarchy:

- City level
 - To facilitate higher order planning, city level facilities are provided.
- Neighborhood/ Planning Unit
 - Neighborhood into 2 levels
 - Level I-- 10000-11999
 - Level II- 12000-15000
- Housing Area Level / Neighborhood level
 - Grouped to form Housing Area with an average population of 5000 population.

Higher order facilities as general hospital, intermediate hospital, college, integrated schools, and school for handicapped, socio-cultural and recreational club, fire and police stations are provided at the master plan level. Nursery and primary schools, dispensaries are provided at the Neighborhood.

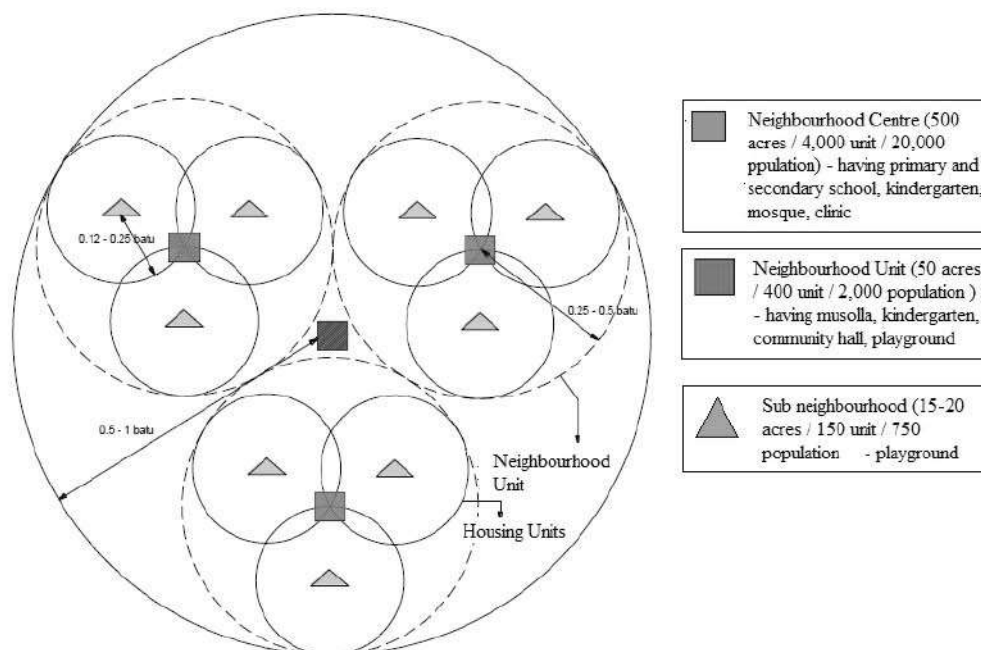


Table 12-9 Details of Neighbourhood Centres (10 Hectares for 10000 to 12,000 population)

Sr. No.	Facilities	No.	Area per Unit (ha)	Total Area (ha)
1	High Secondary School	1	1.6	1.6
2	Dispensary	1	0.1	0.1
3	Community Hall cum Library	1	0.2	0.2
4	Community Room	2	0.1	0.2
5	Primary School with Playfield	2	0.4	0.8
6	Middle School with play field	1	0.5	0.5
7	Electric Sub Station	1	0.05	0.05
8	Local shopping including Service Centre	1	0.45	0.45
9	Neighbourhood Park	1	0.75	0.75
10	Neighbourhood Play Area	1	0.75	0.75
11	Three-wheeler cum Taxi Stand	1	0.05	0.05
12	Religious Building	1	0.05	0.05
Sub Total -A			100	5.5
13	Transportation and Communication			2.5
Grand Total				8.0

Table 12-10 Details of Neighbourhood Centres Provisions (10 Hectares for 12001 to 15,000 population)

Sr. No.	Facilities	No.	Area per Unit (ha)	Total Area (ha)
1	High Secondary School	1	1.6	1.6
2	Dispensary	1	0.1	0.1
3	Community Hall cum Library	1	0.2	0.2
4	Community Room	2	0.1	0.2
5	Primary School with Playfield	2	0.4	0.8
6	Middle School with play field	1	0.5	0.5
7	Electric Sub Station	1	0.05	0.05
8	Local shopping including Service Centre	1	0.45	0.45
9	Neighbourhood Park	1	0.75	0.75
10	Neighbourhood Play Area	1	0.75	0.75
11	Three-wheeler cum Taxi Stand	1	0.05	0.05
12	Religious Building	1	0.05	0.05
Sub Total -A			100	5.50
13	Housing Area			2.00
Sub Total -B				7.50
14	Transportation and Communication			2.50
Grand Total				10.00

12.12 Zoning Regulations

In order to promote public health, safety and the general social welfare of the community, it is necessary to apply reasonable limitation on the use of land and buildings. This is to ensure that the most appropriate economical and healthy development of the city takes place in accordance with the land use plan. For this purpose, the City is divided into a number of use zones, such as residential, commercial, industrial, public and semi-public, etc. Each zone has its own regulations as the same set of regulations cannot be applied to the entire town.

Zoning protects residential area from the harmful invasions of commercial and industrial uses and at the same time promotes the orderly development of industrial and commercial areas. By regulation the spacing of buildings, adequate light, air, protection from fire etc. can be provided. It prevents overcrowding in buildings and land thus ensures adequate facilities and services.

Zoning is not retrospective. It does not prohibit the uses of land and buildings that are lawfully established prior to the coming into effect of the zoning regulations. If these uses are contrary to the newly proposed uses, they are termed as non-conforming uses and are gradually eliminated over years without inflicting unreasonable hardship upon the property owners.

The zoning regulations and their enforcement are a major tool in keeping the land uses pattern of the Comprehensive Master Plan. It has been stated that the consultants have adopted the UDPFI guidelines with minor modification. However while detailing out the use permissibility, etc in various categories all care has been taken to integrate:

(A) Assam Building Byelaws 2014 for Notified Urban Areas of Assam (Other than Guwahati)

(B) "Guwahati Building Construction Byelaws" (Planning and Building Standards), Regulation 2020;

(B) URDPFI Guidelines.

This formulated guideline may adopt other provision of the regulation towards intensity of development and built form guidelines, etc.

- 1) In the Guwahati Master Planning Area (GMPA), various use zones namely Residential, Commercial, Mixed Use, Industrial, Public and Semi- Public, Recreational, Transportation, Agricultural, Protective and Undevelopable Areas having their location as indicated in the Master Plan shall be regulated and guided.

Except or otherwise provided, no structure or land here inafter shall be erected, recreated or altered unless its use is in conformity with the following regulations.

- 2) All existing places of worship, temples, churches, mosques, burial and cremation ground etc. shall be exempted from being treated as nonconforming uses, provided that continuance of such uses are not detrimental to the locality as decided by the Authority from time to time.
- 3) All non-conforming uses of land and buildings shall be discontinued by the owner and the modified uses shall be made to confirm to the land use of the development plan in force within six months of the Regulations coming in force.

12.12.1 Residential Zone (R)

Residential Zone is pure residential area in which major commercial and industrial activities are not allowed, however some for day-to-day needs of shopping uses should be allowed. In addition, a comprehensive range of community facilities, including schools, medical facilities, neighborhood retail and open space are allowed. Total 99.71 sq.km (41.02%) of area is earmarked for Residential Zone in the proposed land use plan.

As conurbation area will be facing the higher pressure of development, ample residential area is proposed in order to accommodate the future expansion which will take place in the future. No other than residential uses are allowed in this zone; however, housing will be developed with a comprehensive range of community facilities, including schools, medical facilities, neighborhood retail and open space.

12.12.2 Commercial Zone (C)

Total **6.87** (2.83%) sq.km of area has earmarked in the proposed land use plan as Commercial Zone for commercial land uses. This zone allows a range of commercial uses including retail shops, offices, small-scale warehouses, and the hospitality industry that includes hotels and entertainment venues.

Further, the zone is classified in three categories viz. Commercial Mixed Use and Commercial.

CMU: Commercial Mixed Use comprising organized vending area, General retail, Wholesale, Hotels, Malls, Ware houses, etc.

C: Retail Shopping Zone, General Business and Commercial District/ Centres, Regulated markets, Service Sector, Regulated/ Informal/ Weekly markets
Wholesale, Go-downs, Warehousing

Existing industrial activities will be allowed to continue as non-confirming use but no new industrial related activities would be allowed in the earmarked commercial zone.

Retail Space:

- Neighborhood and Community Level Retail Space- will be located near residential area that will include kiosks, shops, and community markets; where day-to-day needs of consumers, particularly food shopping and convenience goods will be accommodated.
- District and City Level- Larger commercial center and intermediate commercial centres, which includes the prime retail space represented by malls and high quality shopping space

Office Space:

Offices space will be required primarily for the indirect employment generated because of direct employment in the base industries and economic sectors. The following sectors will require office space:

- Transport and Storage
- Construction and Infrastructure
- Public Administration
- Utility Companies and Institutional bodies
- Banking and financial services
- IT based company and tele communication

It is assumed that the wholesale, retail sectors, banking and financial sectors will operate out of their own premises.

12.12.3 Mixed Use Zone (MU)

Total 24.82 (10.21%) sq.km area is earmarked as Mixed Use Land Use in the Proposed Land Use. Major portion of this zone is located along the Guwahati Bypass road and small of it along NH 27 that is passing from Jalukbari to Khanapara area. 150 to 300 meter of influence area on both sides of these roads are proposed as a Mixed use zone. In the proposed Mixed Use zone major of the FSI will be available for commercial/institutional/ PSP purposes, while the rest of the FSI will be for residential purpose.

If for any reason, the area allotted for commercial development will not fully or partly developed for commercial activities then the area can be used for residential purpose; however, if the residential area is not fully developed then allotted residential area cannot be used for commercial purpose. Locations of the Mixed Use Zone is as per the Proposed Land Use Map. However, Existing non-confirming zone is allowed to continue without further expansion/extension but no new industrial activities will be permitted.

12.12.4 Public and Semi-Public Zone (PS)

Guwahati is home for many educational and health institutes like AIMS, Indian Institute of Technology, Cotton university, Guhati University and Govt. Primary, Secondary and Higher Secondary Schools. It is considered a favorite destination among students in the lower part of Assam. This has led to many educational and health institutes being established within the planning area leading to an increase in percentage of land falling under the public and semi-public category against the prescribed limit of URDPFI guidelines for P&SP land use.

PS: Govt./Semi Govt. / Public Offices Govt. Land use, Police Headquarter/ Station. Police line, Educational and Research, Medical and Health, Socio Cultural and Religious (incl. Cremation, Cemetary and Burial Grounds),Cantonment/ Battalion Area, Knowledge District / University, Utilities and Services (STP, SWTP, Sub Stations, Communication, etc.)

Total 32.53 sq.km (13.38 %) of area is earmarked as a Public and Semi-Public zone in the proposed land use map. Health, Educational, Cultural, Government Buildings, sports and open space facilities will be allowed in this zone.

12.12.5 Industrial Zone (I)

To create a conducive environment for development, Industrial Zone is created. Total 6.11 sq.km of the Industrial land use zone has demarcated at different locations like, Gauripur, Agyathuri, Shila, Namati Jalah and Niz sundari ghopa in the proposed land use plan.

The Industrial zone is further classified in two categories viz. I-1, and I-2.

I-1: Service, Manufecturing and Light Industry

I-2: Extensive and Heavy Industry

The distribution of the main industrial zones is shown in the map. Only industrial activities are allowed in the demarcated industrial land use in the Proposed Land Use map. In addition, small workshops and businesses can be allowed on the edge of the main industrial. However, existing land uses within the proposed industrial zone will allow as non-confirming use until redevelopment of such land parcels.

12.12.6 Recreational Land Use (Green belt) (P)

In order to ensure that the city is an attractive and desirable place to live, a high proportion of the developable area is proposed for open spaces and recreational activities.

The Recreational zone is further titled as P.

P: Play Ground, Stadium, Sport Complex, District Sport Centre and District Multipurpose Ground, Zoo, Regional Park, District Park, Neighbourhood Park, Community Garden, Organised Open Space, Resort and Amusement Park.

Total 38.37 sq.km of area earmarked as Open Space and Recreational Land Use, where recreational activities, parks, riverfront development, playground, theme parks, and exhibition grounds can be allowed.

12.12.7 Protective and Undevelopable Use Zone (E)

Protective and Undevelopable Use Zone integrates all existing Waterbodies (i.e. rivers, streams, lakes, fisheries, natural drains and wetlands, as indicated in the topographical sheets published by the Survey of India, the State Irrigation Department or Revenue Department or other competent Authorities), Reserved Forest and Tree Clad Areas. The boundary of the waterbodies relate to the full tank level as indicated in relevant maps, covering both perennial and non-perennial parts when such distinction exists. As per the MoEF Guidelines, no development buffer is given surrounding the waterbodies. Depending of the size of the waterbodies, the buffer width varies between 9 to 50 meter. The 50-meter buffer is given to the larger waterbodies, such as rivers, wetlands, while minimum of 15-meter buffer is kept around small waterbodies, such as nallas, streams, small water ponds, etc. There are around 84.91 sq.km of land is covered with Protective and Undevelopable Use Zone in the Planning Area.

Protective and Undevelopable Use Zone is divided into two parts,

E-1: Conservation Zone - 1

It is defined as the zone with ecologically fragile with flora and fauna required protection. All the notified water bodies and other important water bodies, active flood plane area, notified forest, wild life sanctury and active flood plain areas where no development/construction shall be allowed.

In addition, no development buffer around the forests and river is also earmarked as

a Conservation. No development should be allowed within the close proximity to it. No development is permitted in this zone around river, channels and water body up to full tank level of existing water bodies.

The total area covered under Conservation – 1 Zone are increased up to 64.9 sq.km. where no building permission will be permissible.

E-2: Conservation Zone - 2

It is defined as a Zone with restricted development. This Zone shall extend to all the developable Hills and area surrounding Hills and adjoining plain area prone to landslide and soil erosion. It shall also includes the area described as hazard prone by DDMA. However, low intensity development/ construction shall be allowed considering the slope from 0° to 45° Degree slop and in areas identified by DDMA as landslide and hazard prone no development of the construction shall be allowed. The indicative development strategy in this Zone shall be as followed:

0-15 degree – Full Development

15 to 30 degree – Medium Development, 30 to 45 degree – Low development

The total area covered under Conservation – 2 Zone are restricted to 20.01 sq.km. where regulated building permission will be allowed.

12.12.9 Transportation Zone (T)

Total 21.69 sq.km of area is specifically earmarked as a Transportation Zone for which permissible facilities as classified below-

- ISBT
- Railways
- Multimodal Transit Hub
- Integrated Freight Corridor
- Parking
- Logistics Hubs (Bus Terminals and Truck Terminals)
- Tele-Communication

Further, the zone is classified in two categories viz. TOZ and T

1. Transit Oriented Zone (TOZ)

This is an Overlay Zone which provides opportunity for mixed use and high density development along the Bus Rapid Transit (BRT) corridor and Metro Rail Transit (MRT) corridor except in Core City area.

Local Area Plans, including measures for road widening, parking management and pedestrianization, shall be prepared for this Zone.

If the line of this Transit Oriented Zone divides a Building Unit, the entire Maximum Permissible FSI shall be permissible for development, irrespective of the part of the Building Unit that is not in TOZ Zone. This incentive shall not be valid for plots amalgamated after the date of publication of the Master Plan - 2045.

Permissible Uses

The types of uses permissible in a Building Unit shall be:

Residential, Commercial, Religious, Business, Educational, Institutional, Mercantile, Storage, Transport, Hospitality, Sports and Leisure, Parks and Temporary Use

Floor Space Index (FSI)

2. The maximum permissible FSI of a Building Unit shall be 4.0.
3. Base FSI shall be available as per Zoning Table 9.2. Additional FSI shall have to be purchased by payment to the GMDA.

Maximum Permissible Height

1. The Maximum Permissible Building Height shall be regulated according to the width of the road on which it abuts and as prescribed below:

Road Width (in meters)	Maximum Permissible Building Height (in meters)
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Up to 60 mts	45.0
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2. The height of Building shall be measured from the Ground level of the Building unit to the top of the building.
3. Parapet of 1.15 mts shall be excluded from the height consideration. Height up to 2.4mts for the following shall not be taken in to consideration in determining the total height of building- stair-case cabin, water storage tank, parapet, lift well, lift cabin with machine room above, as per the requirements of lift inspector.

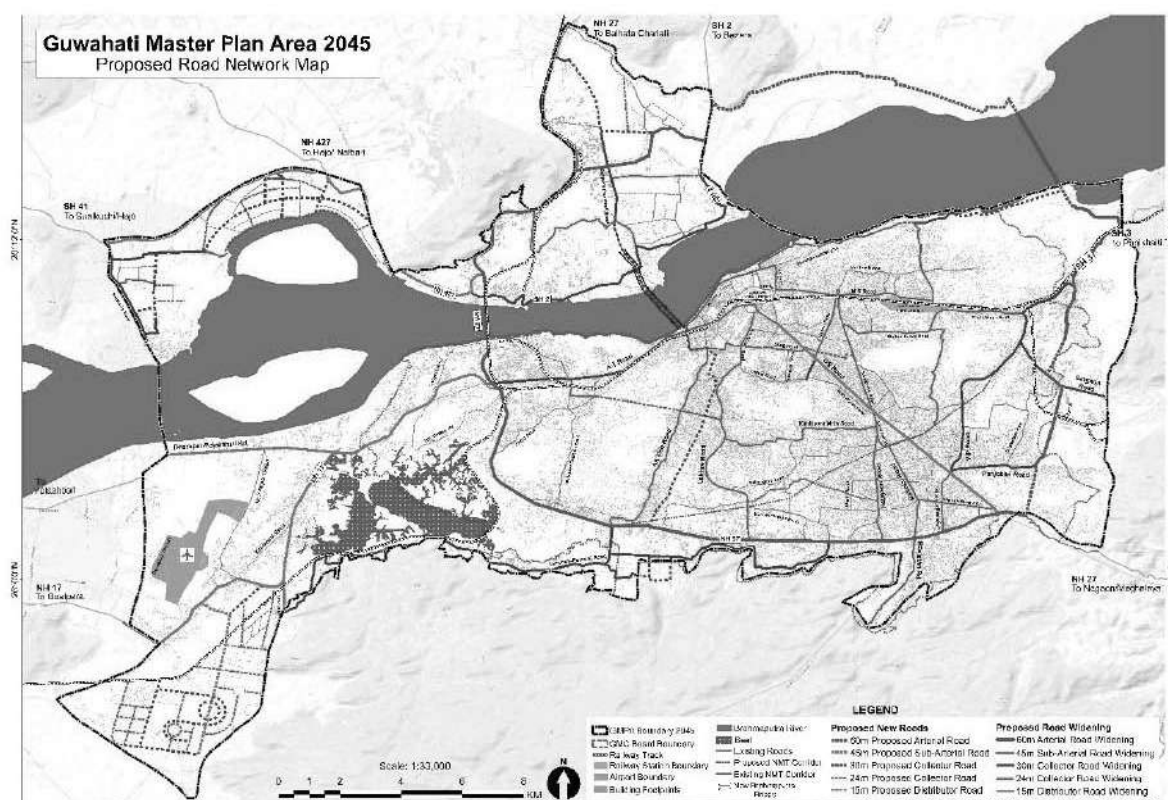


Figure 12-7 Proposed Road Network Map

Each Planning Zone can be put to such use(s) as detailed out in the Master Plan. The proposed Land use Plan indicates the location of broad uses and major facility areas. The requirements of these facilities are subject to necessary modifications when the detailed Zonal Development Plans are conceived. Therefore, the purpose of Zonal/Sub-zonal byelaws and regulations is not to stop the urban development activities in the Planning Area but to serve as broad policy framework for the promotion of planned development. The Master Plan proposes building activity within the prescribed Local Area limits should be controlled and guided by following set of regulations as spelt out in the below table.

The aim of enforcing the regulations is to achieve a desirable development pattern and structure with good quality of life. In order to ensure complete harmony between land uses, town has been divided into various Use Zones including Residential, Commercial, Industrial, Recreational, Public & Semi-Public, Transport & Communication, Agriculture, Plantation, Water bodies etc. However, in enforcing Master Plan proposals the regulations have been made efficient to avoid inconvenience to public. Mixed land use concept has also been adopted and prescribed which shall need approval of Government. The adoption of mixed land use concept is to enhance functionality of the uses.

12.13 Space Standards & Development and Design Controls

Space standards are fundamental to obtain the basic objective of Zoning Regulations to achieve desirable pattern of development in each Use Zone. Strict enforcement is needed to achieve articulated urban development as envisaged in the Master Plan.

Table 12-11 Spatial Norms and Standards

S.N	Description	Standard Prescribed	Plot Area/ Unit (HA)
A	Educational Facilities		
1	Pre-Primary School	1 for 2,500 – 4,000 Population	0.08
2	Primary School (including a playfield)	500 students / 4,000 Population	0.4
3	Middle School (including a playfield)	1000 students or 1 for 7,500 Population	0.6
4	Middle School with Hostel	1000 students or 1 for 7,500 Population	0.75
5	Higher Secondary School (IX-XII)	1000 students or 1 for 10,000 Population	1.6
6	Higher Secondary School (IX-XII) with Hostel	1000 students or 1 for 1,00,000 Population	2
7	Integrated School (Class I-XII) with Hostel	1000 students or 1 for 1,00,000 Population	3.9
8	Integrated School (Class I-XII) without Hostel	1500 students or 1 for 1,00,000 Population	3.5
9	School for Handicapped (including a playfield)	400 students / 45,000 Population	0.5
10	College (including a hostel and playfield)	Students 1000-15000 or 1.25 Lac Population	4
11	University campus without residential quarters	-	10
12	New University Campus with residential quarters	-	30
13	Industrial Training Institute (ITI)	500 students / 10 Lac Population	2
14	Polytechnic	400 students / 10 Lac Population	2
15	New Engineering College	1500-1700 Students	30
16	Medical College with Specialized General Hospital	1500-1700 Students	15
B	Health Care Facilities		
17	Health Unit / Dispensary	1 for 15,000 Population	0.1
18	Nursing Home / Maternity Centre	30 Beds / 1 per 45,000 Population	0.25
19	Polyclinic with some observation beds	1 for 1 Lac Population	0.25
20	General Hospital (300-500 beds) with residential accommodation	1 for 1 to 2.5 Lac Population	6
21	Intermediate Hospital with residential accommodation	100-200 Beds / 1 Lac Population	3.7

22	Intermediate Hospital	80-100 Beds / 1 Lac Population	1
C	Socio-Cultural Facilities		
23	Community Room	1 per 5,000 Population	0.1
24	Community Hall and Library or Multi-purpose Hall	1 per 15,000 Population	0.2
25	Recreational Club	1 per 15,000 Population	0.3
26	Recreational Club	1 per 50,000 Population	0.5
27	Recreational Club	1 for 1 Lac Population	1
28	Music, Dance & Drama Centre	1 for 1 Lac Population	0.2
29	Club Houses	1 for 1 Lac Population	1
30	Museum & Art Gallery with Parking	-	1
31	Community Centre with Hall and Library etc	1 for 15,000 Population	0.3
32	Meditation and Spiritual Centre	1 for 50,000 Population	0.5
33	Botanical / Zoological Park	1 for 1 Lac Population	5
34	Exhibition Area (s)	1 for 1 to 10 Lac Population	10
35	Cinema / Theatre	1 for 1 Lac Population	0.5
36	Stadia / Sports Centre/ Complex	1 for 1 Lac Population	8
37	Mini-Play Field	1 for 2,500 Population	0.75
38	Play Field	1 for 15,000 Population	1.5
39	Religious Place / Structure	1 for 2,000 Population (for all community)	0.2
40	Religious Place / Structure	1 for 10,000 Population (for all community)	0.5
41	Graveyards	1 for 20,000 Population	2
42	Cremation Ground	1 for 50,000 Population	0.5
D	Distribution Services		
43	Post and Telegraph Office	1 for 1.5 Lac Population	0.4
44	Post Office	1 for 40,000 Population	-
45	Telephone Exchange	-	0.2
46	Petrol Pump	1 per 225 ha of Gross Residential Density	0.2
47	Petrol Pump	1 per 40 ha of gross Industrial Density	0.2
48	Milk Booth	1 for 5,000 Population	-
49	LPG Godown	1 for 50,000 Population	0.2
50	LPG Plant with Bottling Facility	-	1
51	Electrical Sub Station of 11 KV	1 for 15,000 Population	-
52	Electrical Sub Station 66 KV	1 for 1 Lac Population	-
E	Police and Fire Services		
53	Police Station	1 for 90,000 Population	1.5
54	Police Post	1 for 40,000 Population	0.2
55	Fire Station	1 for 90,000 Population	1.5
F	Slaughter House		
56	Slaughter House	1 for 1 Lac Population	0.4
57	Abattoir	1 for 1 Lac Population	1

13. IMPLEMENTATION AND MONITORING

13.1 Provisions Given in the Guwahati Metropolitan Development Authority ACT, 1985

In order of secure planned development of Guwahati Planning Area, it will be important that proposals defined in the GIS Based Master Plan of Guwahati are implemented on the ground in letter and spirit. The concept defined in the Comprehensive Master Plan for securing rational development shall not be achieved unless it is adequately supported through a well-defined mechanism for ensuring its proper implementation.

Use and Development of land

As per Section 24 of the Act, no person can use or permit or carry out any development in the Planning area without conformity with the Master Plan after coming into operation of the Master Plan. No development can be taken up by an individual and Department of the Government without the permission of the Competent Authority for which an application shall be made accompanied by documents and fee, as may be prescribed under Section 25. Act provides for regulating all constructions / development undertaken by any person including stopping of illegal construction, imposing penalties, demolition of buildings etc.

Acquisition and disposal of land

Section 104 of the Act provides for acquisition of land as per the provisions under Land Acquisition Act, 1894 for public purpose. The Planning Authority may, at any time, and for the purposes of a Master Plan acquire any land with the sanction of the Government. Land is acquired by the Government and then transferred to the Authority for development on payment of compensation.

Levy of Betterment Fee

As per Section 67 of the Act, Every property which has increased in value due to its inclusion within an area under a plan or a scheme or due to the execution of such schemes shall be charged with a betterment fee and such change or development is capable of yielding a better income to the owner, the Planning Authority may levy a not exceeding 1/3 rd of the estimated increase in the value of the land or building for permitting such change in use or development.

13.2 Policy Framework Related Actions

It will be important to focus on following to achieve the effective implementation besides promoting planned development of the local area. This should include:

- Putting in place appropriate order of manpower in Town Planning and Engineering division within the Authority
- Creating a dedicated Enforcement Wing for implementing the Master Plan
- Creating Land Bank – creation of inventory of Government Land through which status of Government land can be monitored (buying & selling of Government Land)
- Looking at new options for generating resources for funding the development work for making urban development self – financing.
- Involving Private, Corporate and Cooperative Sectors as major partners in the Planning, Development & Implementation of Master Plan through an investor friendly framework.
- Creating awareness among people about the role and importance of Comprehensive Master plan including its major provisions and schemes to make local citizens as partners in the development process and in providing appropriate quality of life.
- Creating a High-Powered Board for coordinating the activities of various departments operating within the planning area and define Policy Framework for implementation of GIS Based Master Plan 2045.
- Maintaining a GIS based system for updating database and monitoring of Master Plan implementation. (Master Plan 2045 is already prepared on GIS platform which has to be updated time to time)
- Phasing of development and developing trunk infrastructure including major roads, water supply, sewerage, drainage or electricity etc. as per priority.
- Formulation of the annual plan and identification of projects for implementation within the framework of approved Master plan - adopting Project Based Approach.
- Transforming the role of Government/Authority from 'Provider to Enabler' and devising innovative methods of resource mobilization.
- Making use of different central and state government schemes to finance major proposals in the GMP 2045.

13.3 Land Pooling and Plot Reconstitution for Plan Implementation

Based on the pattern followed in states of Maharashtra and Gujarat, GMP 2045 advocated the use of land pooling and reconstitution mechanism to manage, service, reconstitute the private land and promote planned development. The mechanism involves development without acquisition of land involving land owners as equitable interests in the development process. The entire development cost is generated out of part sharing of increase in land values due to planned development of the area. Land is earmarked for roads, open spaces, parks, play grounds and amenities including healthcare and education. Planning Authority also gets land from the scheme, which is disposed off by the designated agencies to raise resources to meet the development cost and pay the cost of land, which is used for public purpose, etc. Land owners get full compensation of land, which is used by public agencies and shares the cost of development. The scheme is prepared in consultation with land owners, which minimize the chances of conflict between land owners and the Planning Authority. Development agency on its parts gets land for roads, open spaces, amenities, etc. free of cost without resorting to land acquisition. The developed land which is made available to land owners can be disposed off by him in the open market at a negotiated price fetching him higher returns.

Land Pooling and Redistribution Scheme (Town Planning Scheme)

It is a land development technique undertaken by the land owners who pool their land to receive a good layout, following a procedure involving:

- Notifying an area for Town Planning Scheme.
- Pooling of land of different land owners to the Authority.
- Preparing a detailed scheme as per the provision of Master Plan indicating the original and final plots, roads, open spaces, amenities, involving the land owners.
- Redistribution of final plots after charging betterment contribution and paying compensation for the land used for public purposes, transferred to the local authority.
- The role of development authority remains most critical in order to finalise the scheme by involving land owners, preparing layout plans, getting it approved from land owners and the state government and ensuring execution of scheme. In the entire process land is developed as per the plan involving no acquisition of land. This is the major feature which distinguishes Town Planning Scheme from other modes of land assembly like bulk acquisition or bulk acquisition of selected land for public amenities. After the Town Planning Scheme is finalized, entire land

earmarked for public purposes involving roads, open spaces, amenities, etc. vests with the local authority without paying any compensation and is generally called "Land Acquisition without tears". It makes land owners also happy because they lose only part of their land used for public purposes and get the remaining land after planning with freedom of disposal in urban markets. Compensation is also paid to the land owners for the land which is used for public purpose. However, the scheme has been found to popular in large cities with adequate demand of land. Scheme has one drawback that it takes considerable time for finalization. However, the model adopted by state of Gujarat for speedier framing of T. P. Scheme could be used for formulation of T. P. Scheme on time bound basis. This method can be considered for adoption by Guwahati Planning Authority after detailed study of various aspects of the scheme and legal framework required to make these schemes a reality. It would also require placement of trained manpower to be put in place to frame and finalise the T.P. Scheme.

Spatial planning of any urban area tends to increase the land value of that area. A further increase takes place when the actual development works start. It's a common experience that ULBs excepting a few municipal corporations lag badly in executing the development works which mainly consist of basic civic services. This is mainly on account of the paucity of funds. Since the spatial planning and the development works tend to increase the land prices, it was thought necessary to mop up a part of the incremental increase in prices for the purpose of carrying of the developmental work. Traditionally this has been sought to be achieved by levying charges at two stages termed betterment charges and development charges. As soon as the spatial planning is finalised, the authorities responsible for spatial planning levies a charge termed as betterment charges.

Unfortunately, this charge, however, does not lead to any net income for the planning authority. This is because the entire rationale seems to be individual owners of plot are going to surrender land owned by them for the development works and therefore, are entitled to some compensation. The cost of carrying on the planning work will be offset. Therefore virtually there will be no net income to the planning authority.

Anticipated expenditure for laying of roads and various other civic services. Part of the increment of land value on account of this is sought to be mocked up by levying the development charges. However, actual amount generated falls much below the expenditure for levying the services. Secondly, this charge is levied and collected when a person owning a plot comes for actual development on that plot. Here also this

hardly serves the purpose of effectively providing the fund backup needed for actually executing development jobs.

The government has therefore in various states has made provision for a part of the land under development to devolve on the spatial planning authority. The idea is that funds generated by the sale of the devolved land would be helping the institutions to carry on the development works, if need be, by borrowing funds from the public finance institutions by putting the sum as margin money.

In case the state government agrees to resorting to land pooling methodology for executing town planning, the suitable provisions can be made for reservation of land for the planning authority for generating funds needed for actual development. In this context, as is being done in Maharashtra and Gujarat.

13.4 Resource Mobilisation

Availability of adequate resources is essential for the successful implementation of the Master Plan. This demands rejuvenation of urban centers to attract more and more investments in those areas. Implementation of the Master Plan requires huge amount of financial resources and it is impossible for the Planning Authority to bear such huge amount of money. There are certain fiscal mechanisms that can be adopted for mobilizing the financial resources.

Land remains the critical element of urban development and accordingly can be leveraged to raise resources for urban development and implementation of the GMP. Land values remains closely linked with the use to which the land is put and permission is granted to use the land in urban context. From the experiences, it is found that the only mechanism to fund the urban infrastructure is to undertake and promote planned development either by the parastatal agencies or by the private, cooperative, corporate sectors. Both these mechanisms can be leveraged by Development Authority to raise resources/ implement the GMP provided the legal framework permits the same and authorizes the Authority to regulate it.

13.4.1 Land Based Financing Mechanisms

Apart from the government grants or development funds from the upper tiers of government, the ULBs would require adequate funds from their own sources to meet the objectives of facilitating urban development. Thus, it is inevitable for any local body to generate revenue. Table below shows categorywise sources of revenue of ULBs in India. Most of the ULBs use tax sources and grants to finance their activities, while the other sources of revenue are often ignored or not tapped to the potential that exists. For example, public debt available from market – both institutional and individual/retail investors – is rarely accessed to finance the creation of new urban development infrastructure.

Revenue Head/Category	Sources of Revenue
Tax Revenue	Property Tax, Advertisement Tax, Tax on Animals, Vacant Land Tax, Taxes on Carriages and Carts
Non-Tax Revenue	User Charges, Municipal Fees, Sale & Hire Charges, Lease amounts
Other Receipts	Sundry receipts, Law charges costs recovered, Lapsed deposits, Fees, Fines & Forfeitures, Rent on Tools & Plants, Miscellaneous Sales etc.
Assigned (Shared) Revenue	Entertainment Tax, Surcharge on Stamp duty, Profession Tax,

	Motor Vehicles Tax
Grant-in-aids	(i) Plan Grants made available through planned transfers from upper tier of Government under various projects, programmes and schemes (ii) Non-Plan Grants made available to compensate against the loss of income and some specific transfers
Loans	Loans borrowed by the local authorities for capital works etc. – HUDCO, LIC, State and Central Governments, Banks and Municipal Bonds

Table 13-1 Municipal Revenue Sources in Indian states/ULBs

(Source: Mohanty P.K., 'Financing Urban Infrastructure: Some innovative Practices of Resource Mobilisation, CGG working paper, June 2003)

Municipal Resource mobilization needs not only strengthening the existing revenue sources but also using other sources of revenue. Therefore, both conventional and non-conventional sources need to be tapped to the extent possible within the City. The ULBs may benchmark their levy and utilization with reference to the better performing peers within the State as well as outside it. The ULBs may use the general principles of users pay, beneficiaries pay and polluters pay to the justification such that the citizens are well aware of the need for their contribution towards larger societal cause. Table below shows conventional and non-conventional resources that can be tapped by the ULBs.

Table 13-2 Conventional and non-conventional revenue resources

Sr. No	Service Revenue Source	Conventional Source	Non-Conventional Source
1	Property Related	Composite Property Tax	Vacant Land Tax, Service Taxes, Surcharge on Land Registration Duty
2	Water Supply Related	Water Charges	Water Supply Donations, Water Supply Connection Charges, Water Benefit Tax, Water Betterment Charges
3	Sewerage Related	Sewerage Charges	Sewerage Donations, Sewerage Connection Charges, Sewerage Benefit Tax, Sewerage Betterment Charges
4	Solid Waste Management Related	Conservancy Charges	Bulk Garbage Collection Charges
5	Town Planning Related	Building Permit Fee, Development Charges	Betterment Charges; External Betterment Charges; Open Space Contribution; Impact fee; Transferable Development Right; Premium FSI, Sub-division charges; Planning Permission Betterment
6	Engineering Related	No Sources	Road Cutting Charges, Street Tax, Frontage Tax, Cess on Infrastructure, Motor Vehicle Tax/Surcharge on Tax on Petrol and Diesel
7	Trade Licensing Related	Trade Licensing Fee	Business License Fee

8	Advertisement Related	Advertisement Tax	Hoarding Charges, Advertisement Placement Fees, Cable TV Fee, TV Advertisement Charges
9	Shops and Establishment Related	Shop Room rent	Royalty on Auctions

(Source: Mohanty P.K., 'Financing Urban Infrastructure: Some innovative Practices of Resource Mobilisation, CGG working paper, June 2003)

- **Change of Land Use Charges for change of land use from one use to another:**
The landuse conversion charge is determined by the newly permitted landuse of that area which is capable of yielding a better income for the land owner.
- Guwahati Metropolitan Development Act, 1985 provides for levying Development Charges on landowners. Where permission for a change in the use or development of any land or building is granted in the whole or any part of the planning area, and such change or development is capable of yielding a better income to the owner, the Planning Authority may levy a charge not exceeding 1/3rd of the estimated increase in the value of the land or building in the prescribed manner for permitting such change in use or development.
- **FAR:** Intensity of land utilization depending upon Floor Area Ratio (FAR). Higher FAR means higher order of charges to be paid –tradable FAR.
- **Internal Development Charges and External Development Charges (IDC and EDC):** Instrument of development charges have been used extensively to recover the cost of providing new service and infrastructure in areas proposed to be covered by Master Plans. This mechanism has helped in providing development within the approved colonies in terms of roads, water supply, sewerage, sanitation, drainage, electricity etc. besides the social infrastructures involving education, health care, landscape etc. without involving any cost to the Planning Authority as these costs are loaded as integrated part of pricing of developed plots which are made available to people after development.

In addition to internal development charges, charges for external development are also collected by development agencies. These charges include the cost of providing city level services involving arterial / ring roads, bypasses, under bridges /over bridges, water treatment plants, sewage treatment plants, major electrical network, trunk services, city level healthcare, education and other services. This is done through the process of working out total cost of development, as per the proposals defined in the development in the master plan. Based on the total

developed area under different uses, external development cost is worked on the unit basis of area which is then charged from the developers while granting permission for development. External Development Charges (EDC) is then pooled in the City Development Fund which is then used for funding various projects prepared as per the provisions of the development plan.

- **Vacant land taxes:** levied on vacant land kept within the urban limits to minimize speculation and raise money on account of non-utilization of urban services.
- **Tax on land value increase:** Land values continue to increase in urban context due to various development projects undertaken by the Planning Authority (for eg. GIS Based Master Plan) and economic phenomenon of rise in general prices. A basic objective of Land Value Increment Tax is to capture some of this increase for the benefits of the community. This kind of tax is widely used in numbers of countries including Italy, Malaysia, Australia, Korea, Canada and New Zealand.
- **Planning Charges:** Since preparation of master plan, zonal plan and working out detailed schemes and granting planning permission involves expenditure on the part of Planning Authority, accordingly they can be recovered as integral part of the planning permission so as to raise resources. Further, this approach will help in effective implementation of the Master Plan through increased intervention of planning system.
- **Sale or lease of publicly held land:** Public land assets are sold to private parties. This mechanism requires a detailed inventory of government land, market valuation and strategic decisions about the best use of a particular land. Auctions shall be open for the disposal of land. The provision for this mechanism is given in Section 6 of Guwahati Metropolitan Development Authority ACT, 1985.
- **Remunerative Projects:** Planning Authority should take up remunerative projects which augment financial positions and generate revenue for the Authority and subsequently social infrastructure projects can be taken up out of the funds generated from the same. Income from remunerative projects is in the form of rental income from properties like shopping complexes, market fees, parking fee and income from other real assets owned by the GMDA.

The ULBs need to exploit various land based revenues, which have greater implication to urban growth and development and concomitant problems like slum formation, redevelopment, rehabilitation and resettlement. The funds realized from land based revenue sources can be effectively deployed for the improvement of urban poor people

living in the slum areas. Several of these sources may already exist in the ULBs but the potential of the same may not have been exploited to fullest extent. Also, there are several other forms of revenues (or, variants of revenues) that need to be tapped and exploited.

TOD	Land Pooling	PREMIUM FSI	External Dev Charges	Transfer of FSI
<ul style="list-style-type: none"> • Catalyst for real estate market • Encourage people to use Public Transport • Systematic Densification • Finance generation 	<ul style="list-style-type: none"> • Micro Level Planning • Planned and equitable development • Resource generation for govt and land owner 	<ul style="list-style-type: none"> • Use of additional FSI for resource generation • Densification of specific areas • Maintain the skyline 	<ul style="list-style-type: none"> • Mentioned in the Act • Can be area based 	<ul style="list-style-type: none"> • Can be done for Slum Rehabilitation • Resource generation for the Authority/ Municipality

Figure 13-1 Resource Mobilisation

13.4.2 Involving Private Sectors

Considering the enormity of urban development, requirement of enormous resources, level of service/ infrastructure required to ensure appropriate quality of life in Guwahati, it will be critical to involve large number of reputed players in the urban development process in order to ensure effective implementation of master plan. With limited resources available with the parastatal agency, achieving the objective of the comprehensive development plan and its effective implantation appears to be a remote possibility. Accordingly, it will be desirable to make private sector as an active and supportive partner in the process of development and implementation of the Master Plan 2045.

Mechanism of involving private sector will have to be defined clearly in a transparent manner through well-defined policy and legal framework in order to remove any mismatch or ambiguity. Level playing fields have to be created between Private and Public sectors so as not to put private sector in a position of disadvantage. A supportive and exclusive mechanism/ framework will have to be put in place to provide time bound clearance to the private sector development, meeting all the defined norms, standards and conditions of development. Attempt should be made to attract reputed developers in the state in order to usher a new era and culture of urban development. Minor developers should be avoided in order to minimize the chances

of mushrooming planned development and ensure provision and development of integrated city level services. Minimum chunk of land to be developed should be defined which can be sustained as self-contained neighbourhoods having all basic amenities of services, physical / social infrastructures to meet the day to day needs of residents. Well-defined standard of development shall form integral part of such development, so that uniformity of development is ensured.

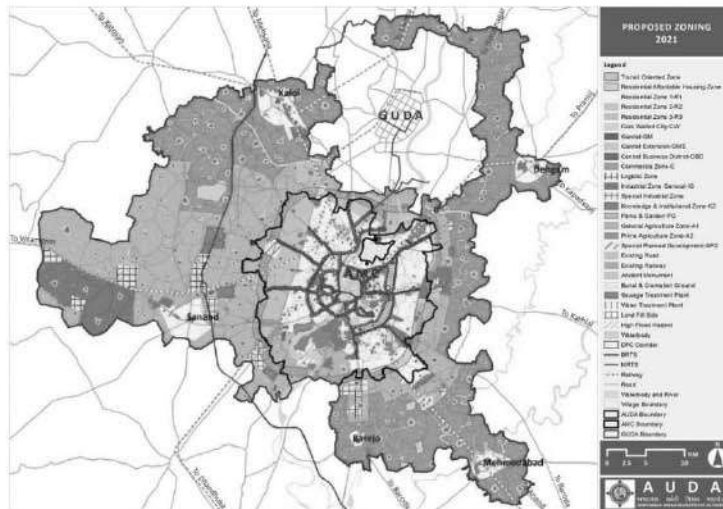
Licensing of developers would be integral and critical part of involving private developers in order to ensure their liability for the development works taken up by them. Legal, institutional and procedural framework for involving private sector in urban development / implementation of master plan needs to be worked out on the basis of detailed study carried out of the pattern adopted by states of Haryana, Punjab, Uttar Pradesh, Maharashtra, Gujarat (where they have put in place successful models of urban development involving private sector. However, such model would need modification depending on the conditions existing in the Guwahati to make it successful operationally.

13.4.3 Best Practices

Land Management Process- Gujarat As the city grows, more land in the surrounding regions gets transformed from rural to urban uses. In the absence of an effective mechanism, this transformation is haphazard and results in congestion and low levels of infrastructure provision. To ensure planned new growth, most cities rely on largescale land acquisition and development of planned layouts. However, this becomes difficult with the increase in land values as well as the active resistance to displacement by displaced landowners. Therefore, it has become imperative to introduce more fair, equitable and inclusive methods of land consolidation that cause minimal displacement if at all. The good example of such a mechanism is from the land process of Gujarat.

Urban planning in Gujarat is a two-step process as prescribed in the GTPUDA and its Rules. The first step is to prepare a "Development Plan" (DP) for the entire city or development area. The second step is to prepare "Town Planning Schemes" (TPS) for smaller portions of the development area for which the Development Plan is prepared.

1. Development Plan (DP)



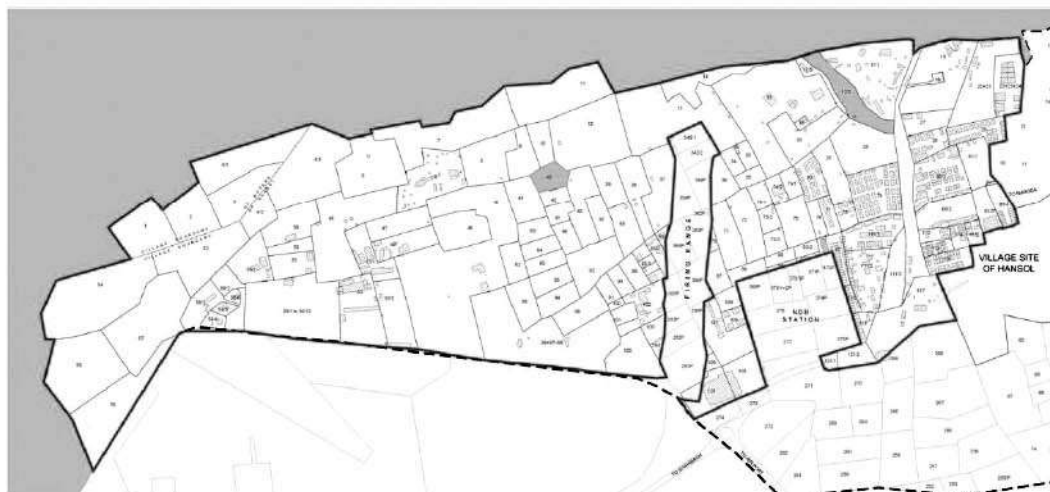
- Provides Overall Development Framework
- Overall Direction of Urban Expansion
- Land use Zoning
- City level road network
- City Level Infrastructure (Utilities & Amenities)
- Reservations of Land for other Public Purposes
- Reservations of Land for Housing for Urban Poor

- Transport Planning
- Development Control Regulations (DCRs)

2. Town Planning Scheme (TP)

- It is an effective instrument for implementation of Master plan
- It is whole to part- Master plan is Macro level and Town planning schemes is a Micro level planning
- Land Reconstitution- Large chunk of land can be acquired for public purpose through reconstitution of land
- neighbourhood Level Road Network
- Local Level Infrastructure Implementation
- Costs are distributed; all owners loose same proportion of land; Benefits are shared
- Public inputs are sought; grievances are redressed

Before TP Scheme



After TP Scheme



13.4.3.1 Public- Private Partnership for Road Infrastructure Development – Ahmedabad

Sardar Patel ring road in Ahmedabad demonstrates how PPP models can be used effectively for city Infrastructure development. AUDA has managed to implement a project of such large scale in a brief period of time and set an example for other Development Authorities and ULBs to replicate this success story. Ahmedabad Urban development Authority (AUDA) has developed BOT model to carry out Phase-II development of Ring road.

Private Sector was involved for all technical inputs from initial stage of the project including Planning, technical and financial feasibility studies, surveys, detailed design, construction, supervision and construction quality control to achieve efficiency.

Private participation was involved for following work:

- Junction development
- Plantation along the road
- Toll tax collection
- Signage development

BOT Model use for Ring road:

BOT model shows an integrated partnership between AUDA and the private party, enabling AUDA to transfer responsibility of design, procurement, construction, operation and maintenance of the road and its facilities to the private party.

The private company generates revenue by collecting fees in the form of toll tax from people using the ring road during the operation and maintenance period.

Key Learning's:

- A participatory approach results in creation of urban infrastructure in a rapid and efficient manner.
- Professional approach to planning and implementation of infrastructure projects.
- Land development through TP scheme leads to an equitable and easy mechanism to acquire land for infrastructure project.



13.4.3.2 Public- Private Partnership (PPP) For Affordable Housing- Rajasthan

Public private Partnership (PPP) is merging as an efficient model for delivery of services across various sectors. The concept of PPP in housing sector has evolved widely in order to meet large demand of housing.

PPP approach allows state agencies to overcome resource deficit, improve cost recovery and increase supply of houses based on demand. The public sector owns controls and regulates the use of land which is the most valuable resource for any housing project.

New Initiatives was launched under the affordable Housing Policy, 2009 for using PPP model in Rajasthan. Different PPP models were adopted for meeting the emerging housing demand.

Model: 1 Mandatory Provision

- Private developers to reserve 15% of the dwelling units or 5% of the residential area whichever is higher to be used for EWS/LIG housing in each of their township/Group Housing schemes

Model: 2 Private Developers on Private Land

Model: 4 Private Developers on Government Land

- Government land to be offered free of cost to the developer to be selected through an open bidding process
- Developer offering maximum number of EWS/LIG flats, free of cost to the ULB would be awarded the project. At least 50% houses should be of EWS category
- Developer shall be free to use the remaining land as per his choice for residential purpose with 10% of commercial use.

Various incentives to Developers are as follows:

- FAR- Double the permissible Floor Area Ratio
- Complete waiver of external Development Charges, Building Plan Approval Fees, Conversion charges & reduction in stamp duty
- Commercial use upto 10% of plot area
- Fast track approval of the project within 30 days
- Buy back of flats by nodal agency of the government at predetermined prices

Key Learning's:

- Shortage of affordable housing is emerging as a major challenge for the government, which can be tackled through a series of measures and policy guidelines
- Joint approach brings together the technical and managerial expertise of the private sector with the accountability and fair pricing of the public sector to improve the housing delivery

13.5 Recommendations & Planning Policy

13.5.1 Importance of Planning Policy Guidelines

It is necessary to create an appropriate policy framework for transfer of Government Land to Development Authorities, allotment of land and properties by Development Authorities, establishment of Master Plan Infrastructure Development Fund and institutional mechanism required for implementation of Master Plan proposals and regulatory framework in an effective and efficient manner.

Master Plan of a city and surrounding areas is usually the guiding force for Urbanization. In context of Guwahati, it is the GMP, the statutory document for guiding the process of Urbanization of larger urban areas. The GMP creates a long-term vision for development of a city and peripheral areas and provides frame work for organized Urban Development.

The present system of implementation of GMP lacks coordination and an integrated mechanism, which has thrown up following challenges. Firstly, the process of Urbanization requires vacant lands, both government and private, to be developed for the purpose of urban settlements through the process of land assembly and planning. This process should be equitable, effective, and efficient and time bound. In absence of Policy tools like Transferable Development Rights (TDRs), land pooling mechanisms etc., optimum results could not been achieved. Secondly, to roll out all projects contained in GMP, mobilization of financial resources at unprecedented level

is required. Successful GMP implementation will require seamless coordination between land allotment, assembly, management, planning and development activities. The task of building and expanding a city to the projected population will require involvement of multiple stakeholders including various departments of Government; therefore, same requires an effective Institutional Mechanism for steering and guiding the process. The challenge of environmentally sustainable and climate proofing of the development needs to be addressed by developing regulatory mechanisms for protection of waterbodies, canals, river, Sustainable Urban Transport strategies through Transit Oriented Development etc.

13.5.2 General Issues Associated with Indian Cities Related to Planning Policy

The growth of India's urban population has not been accompanied with proportionate increases in urban infrastructure and service delivery capabilities. Cities in India face a range of challenges to meet demand and supply gaps in urban regions, in such areas as water, waste management, energy, mobility, the built environment, education, healthcare and safety. The challenges may exacerbate further if timely and adequate action is not taken. The concept of a planned urban administration is yet to be addressed in India's cities and severe supply and demand gaps are driving cities towards a planned approach to tackle urbanization. Piecemeal efforts have been made but they lack the thrust to address mega issues. Urban India faces challenges across sectors, with some requiring immediate attention and others requiring long-term action.

Rapid urbanization in India has led to increased demands for providing state-of-art infrastructure in Urban Local Bodies (ULBs) and the ULBs are continually looking for new sources of funds in order to meet the requirements of creating and upgrading infrastructure. ULBs have to play a crucial role in implementing the urban rejuvenation programmes, but they lack the resources to execute the programmes. Inadequate institutional capacity, inadequate revenues, a lack of collaboration between multiple planning and administration bodies lead to improper implementation of planning policies. Such issues for are described below

Poor collaboration among Planning and Administrative Bodies

The urban governance structure is fragmented in India. At one end of the spectrum lie such cities as Ahmedabad, in which the ULB provides all services, and at the other end are cities such as Bangalore, in which over 10 agencies are involved in providing

urban services. Agencies involved in the planning and administration include ULBs, parastatals, state government agencies and development authorities, among others. With each agency under a different leader, the goals of the agencies are often unaligned, which leads the city to operate in siloes.

Insufficient Capacity

The institutional challenges create a vicious cycle. The inadequate resources coupled with a poor governance structure and archaic processes result in inadequate and low-quality service delivery. Such service delivery attracts lower user charges and compliance that further degrades urban governance and finance.

Inadequate Revenue Base

The ULBs are thus constrained in the absence of funding sources for urban development projects. The major source of revenue for urban local governments are property taxes and user charges but low charge out rates and poor compliance in the payment of charges and taxes have led to financial dependence on the state government.

With declining sources of revenue, local governments must seek funds from the state governments even to fund operational expenses such as the salaries of employees.

Promoting Public-Private Policy Frameworks

PPPs for urban development have had mixed results in India. Urban rejuvenation programmes have encouraged private-sector participation but the following issues must be resolved to attract the best firms:

- Project funding is a challenge with low user charges and insufficient other value capture mechanisms. Although ULBs are not financially independent, they must make projects financially viable through adequate funding mechanisms.
- The sharing of risks in public-private partnership projects has often been suboptimal with revenue risk often passed on to the private sector.
- Government agencies have limited capacity to perform the preparatory work required to develop projects appropriately. The lack of time to ensure good-quality project development could result in reduced private sector interest, mispricing, cost escalation or delays in execution.
- Outstanding and delayed payments to the private sector have resulted in a loss of confidence, aggravated by long-standing disputes.

13.5.3 Approach Adopted to Derive Planning Policy

To derive the planning policy, certain approach was adopted. The first step was to collect the primary data and secondary data for the planning area. For obtaining Primary data, Household survey as well as Transportation survey was conducted. Apart from these, interaction with government officials, institutions, NGOs, various stakeholders were held to understand strengths, weaknesses, opportunities and threats for the planning area. Secondary data for Demography, Environment, Heritage, Tourism, Economic base, Physical Infrastructure, Social Infrastructure, Housing, Traffic & Transportation etc. were collected from various government departments. The satellite imagery was procured from NRSC, Hyderabad to generate scientific base map. Village wise cadastral maps, Town Survey Sheets, FMB sketches were also procured to be the part of seamless base map. Existing land Use survey was conducted to earmark accurate existing land use on base map.

Simultaneously, analysis for demography, economy, Physical Infrastructure including water supply, sewage, solid waste management and drainage, Social Infrastructure including education, health, recreation, government organisation etc., Heritage & Tourism, Traffic & Transportation, Housing, Environment were carried out. Considering the population growth in the study region, village level analysis was done to understand the urbanisation pattern. Last four decades for the villages were analysed along with availability of physical as well as social infrastructure. All the existing available infrastructure facilities based on primary and secondary survey were analysed. After thorough analysis and clear understanding, the policies proposed by Government of India were also studied and incorporated according to the study region. After analysing village level situation of planning area, consulting various stakeholders, options and strategies for planning area are derived. Growth Centres, Growth Points and Transit nodes were identified based on the analysis carried out to give the proposal for future development. Based on the Growth Centres, Growth Points and Transit nodes, circulation pattern of the planning area is proposed with proper hierarchy of roads. The land use based proposals are given at three levels such as overall Guwahati planning area, conurbation area and rural area. Various government projects such as AMRUT, CIDF (City Infrastructure Development Fund) are incorporated in the proposal of GMP 2045.

By looking into the issues for implementing planning policy for Guwahati such as multiple disciplinaries for development works, lack of proper coordination among

government departments etc., the planning policy for implementation of Traffic & Transportation proposals, Proposals of Public & Semi Public uses, proposals of Environment preservation, to develop affordable housing in planning area, for heritage conservation and for various development projects are derived.

13.5.4 Planning Policy

13.5.4.1 *Planning Policy for implementation of Traffic & Transportation Proposals*

To derive the planning policy for implementation of traffic & transportation proposals, issues of this sector should be kept in to consideration. Key issues found across the planning area are not upto the mark designed intersections, lack of road hierarchy, absences of dedicated sufficient parking space around key institutions & nodes, bottlenecks along major roads and pedestrian traffic conflict issues.

By looking into the future demand for the roads for the projected population, the roads proposed for widening are proposed in such a way that it minimizes disturbances to the surrounding plot owners. The road widening is proposed within the SMB with maximum possible manner. The new linkages are proposed wherever the missing links are identified. It is also proposed in such a manner that it does not disturb surrounding settlement. The proposals for road widening and new linkages are described in detail in chapter 6.13. Peripheral outer ring road and missing link roads are proposed to connect the different enclaves to avoid the haphazard traffic flow of Guwahati region. These proposed roads are identified and studied extensively on the ground, analyzed and verified such that the maximum length of the roads falls under the jurisdiction of Government of Guwahati. To enhance the orderly growth through the transportation network system TOD concepts is also applied to have the sustainable development in the study region. Proposals of Public Transportation, Transit nodes, road widening proposals, proposal for new linkages are derived after Transport study. Parking locations are identified in SMB area to manage the traffic congestion within core area.

The other proposals of Traffic & Transportation sector such as transit nodes should be implemented through Land acquisition under the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR). The proposals of road widening, new linkages and parking are to be implemented through the said act.

13.5.4.2 *Planning Policy for implementation of Public & Semi-Public uses*

To derive the planning policy for implementation of proposals of Public & Semi Public uses, issues of this sector should be kept in to consideration. Looking in to the broader level, Guwahati Planning Area is having sufficient educational and healthcare facilities. AIMS, IIT Guwahati, Guwahati Medical College and Hospital, Guwahati Polytechnic, Cotton University, Assam University, ITI Collage etc. are very renowned institutions of State and District level existing in Guwahati. The villages of the planning area are also having sufficient health and educational facilities. For the future requirement of the projected population, Public & Semi Public land uses are proposed in planning area. The Public & Semi Public land uses are proposed on Government Land for easy implementation of public services. This will minimize the hurdles faced during land transaction. As Public & Semi Public land uses are proposed on Government Land, it will be executed at a faster rate. For proposals earmarked over private land, concerned authority such as Education Department, Health Department, PWD, Police Department, Fire Department etc. can take the land on lease and develop it for the public purpose.

13.5.4.3 *Planning Policy for implementation of Environmental proposals*

To derive the planning policy for implementation of environmental proposals, issues of this sector should be kept in to consideration. From the Existing Land use survey, it was observed that the Water bodies of planning area are deteriorating due to various reasons like encroachments around water bodies, solid waste dumping, disposal of untreated wastewater etc. Deepor beel, Brahmaputra, Bharalu, Mora Bharalu, Basistha, Basistha Bahini & Khanajan river are some of the important waterbodies which supports for the drinking and agricultural purposes in the system. But due to the rapid urbanization and pressure on the real estate, it is also observed that there is disturbance in the interconnectivity of channels which leads to the deterioration of the waterbodies. Apart from this, the natural drainage pattern of the town is disturbed by anthropogenic activities viz. encroachment on the drains/waterbodies, dumping of solid waste, disposal of untreated wastewater etc in Rangirkhari Drain, Boyalijur Khal and Dubri Drain. As a result, various issues arise, like flooding, drying of water bodies, water logging etc. These issues can be addressed by providing buffer area on both the sides of the waterbodies. This buffer area would also help us to maintain the canals without any hindrances. Apart from this, due to rapid urbanization, land under

agricultural activities are decreasing. Decline in land under agriculture is to be controlled in such areas of the planning area.

Hence, the buffers are proposed around water bodies within conurbation area and outside conurbation area. Canals and rivers are also proposed to be protected with conservation buffers.

There is a lack of green spaces/recreational area in the planning area. Thus, after the detail study the city level and neighbourhood level parks/playgrounds are proposed. Bhurbhuri Gaon 3 and Timona Gaon are known as the Rice bowl of the planning area. Hence, it is imperative to preserve this rich and fertile agricultural land. This area is preserved by declaring dedicated agriculture zone under GMP – 2045 and Regulated Development will be allowed in certain parts of this area. Untreated wastewater/industrial effluent should not be allowed to discharge in any natural drains/waterbodies. Underground sewerage network has to be provided with adequate sewage treatment facilities.

The land belongs to such buffer area should be developed under strict regulations. Strict monitoring for the implementation of buffer area should be followed. Regulated development with special permission from GMDA will be allowed in such buffer areas. Existing structures in the buffer areas shall remain as it is. Permission for redevelopment on site of existing structures or renovation may be obtained from GMDA. Permission for any new development may be obtained from GMDA in consultation with T&CPD, Guwahati.

13.5.4.4 Planning Policy for implementation of Affordable Housing in planning area

Owning a house is considered a big issue in today's societies. As such, an exact measure of housing affordability is essential to ensure the need for shelter. Housing is the basic human needs; it is also one of the most important components of urban economic development in any country. In addition, the socioeconomic stability of a country is always depending on the housing affordability of the country. For this reason, housing is a valuable asset that always has a great impact on societal wellbeing. Housing affordability became greater focus in every society; and the affordability problem with regard to housing market is one of the most controversial issues within most developed and developing countries.

It is observed that the price of all kind of housing have been increasing exorbitantly, which indicate that the investment in housing sector is unable to match pace with the

increasing demand for housing. Given the importance of housing, there are several issues which need to be tackled to promote the provision of this basic need in Guwahati. Rapid urbanization and rural to urban migration has led to a substantial shortage of housing in the region. The direct result of this is the concentration of informal settlements in the city. Given that the shortage in housing is concentrated at the bottom of the pyramid, the sector can play an important role in the socio-economic development.

Moreover, with the rapid urbanization and significant increase in the housing demand, housing sector is considered to be the Engine of immense potential giving a push to the economy because of its link with the employment generation and livelihood. Therefore, provision of housing can make a significant difference in income of families, both in rural and urban areas.

Public Housing in Singapore – a successful model

Today, more than 80% of Singapore's population is living in public flats, with 93% of them owning their flats. Because of this, the public housing model of Singapore is considered as one of the most successful examples of affordable housing models in the world. The Housing and Development Board (HDB) is Singapore's public housing authority and a statutory board under the Ministry of National Development. As Singapore's sole housing agency, the HDB is unique in its organizational structure, function, and approach to housing. It operates like a single, comprehensive source for housing development and coordinates planning, land acquisition, construction, financing, and policy for housing in Singapore. By centralizing its public housing effort, Singapore has avoided the problems of government silos and fragmentation of duties that are associated with multi-agency implementation.

The unique aspect of Singapore's housing model is that emphasis is on ownership rather than rental. Affordability is ensured through a set of modalities, including the provision of different unit sizes, progressive mortgage payments (based on income levels), low interest rates and government subsidies. For example, government subsidizes low-income groups and first-time buyers for buying houses. Till date, HDB has developed more than 900,000 flats in Singapore, which have been given to Singaporeans.

Housing for All by 2022 – A National Mission

In June 2015, the Union Cabinet chaired by the Prime Minister gave its approval to the “Housing for All by 2022” - National Mission for Urban Housing to address the issue of affordable housing in urban areas. National Urban Housing Mission seeks to meet the gap in urban housing units by 2022 through increased private sector participation and active involvement of the States. It has four broad components or verticals out of which credit linked subsidy would be implemented as a Central Sector Scheme and not a Centrally Sponsored Scheme.

a) Slum rehabilitation of Slum Dwellers with participation of private developers using land as a resource - The Centre would provide a grant of INR 1 lakh per house to the state for deployment in the development of any slum rehabilitation project

b) Promotion of affordable housing for weaker section through credit linked subsidy - An interest subsidy of 6.5% on housing loans will be provided to EWS/LIG categories, which can be availed upto a tenure of 15 years.

c) Affordable housing in partnership with Public & Private sectors - Central assistance at the rate of INR 1.5 lakh per house for the EWS category will be provided.

d) Subsidy for beneficiary-led individual house construction or enhancement- Central assistance at the rate of INR 1.5 lakh per house for the EWS category will be provided

13.5.4.5 Planning Policy for Heritage conservation

The heritage buildings in the core city area are being converted in to modern style building which lead them to loss of heritage value of the French rule. These buildings must be preserved as it is as they are with the great heritage importance. The heritage conservation in Core city area can be done through Transfer of Development Rights (TDRs). TDRs are given for preservation of heritage landmark buildings and is a way to compensate the property owners for loss in revenue on their properties. Transfer of Development Rights (TDR) is a zoning technique used to permanently protect cultural resources by redirecting development that would otherwise occur on these resource lands to areas planned to accommodate growth and development.

Transfer of Development Rights programs enable landowners within cultural resource areas to be financially compensated for choosing not to develop some or all of their lands. These landowners are given an option under municipal zoning to legally sever the “development rights” from their land and sell these rights to another landowner or a real estate developer for use at another location.

The land from which the development rights have been severed is permanently protected through a conservation easement or other appropriate form of restrictive covenant, and the development value of the land where the transferred development rights are applied is enhanced by allowing for new or special uses, greater density or intensity, or other regulatory flexibility that zoning without the TDR option would not have permitted.

Establishing a TDR program involves the following basic steps:

- Establish the TDR option and administrative provisions. Use of TDRs must be established as a voluntary option.
- Establish the area of high resource conservation value
- Determine the number of TDRs allocated to each landowner within the high resource conservation area (usually a simple mathematical formula – e.g., one TDR for every five 5 acres)
- Establish the procedure for severance of TDRs
- Provision of the use of a Deed of Transferable Development Rights document
- Establish the procedure for conservation of heritage buildings
- Establish the receiving area (area or areas planned to accommodate growth). Potential receiving areas can be residential, commercial, industrial, or institutional in character, or any combination thereof.

13.5.4.6 Framework for application of Value Capture Finance (VCF) methods to projects

VCF seeks to enable States and city governments raise resources by tapping a share of increase in value of land and other properties like buildings resulting from public investments and policy initiatives, in the identified area of influence.

The different instruments of VCF are; Land Value Tax, Fee for changing land use, Betterment levy, Development charges, Transfer of Development Rights, Premium on relaxation of Floor Space Index and Floor Area Ratio, Vacant Land Tax, Tax Increment Financing, Zoning relaxation for land acquisition and Land Pooling System.

Some Indian cities through state urban regulations have been developing and exercising some of VCF mechanisms – The Mumbai Metropolitan Region Development Authority (MMRDA) and City and Industrial Development Corporation Limited (CIDCO) have used different Value Capture methods including Betterment levy to finance infrastructure development in the urbanizing areas. Tamilnadu and

Maharashtra have made Land Value Tax applicable to urban areas too under which increase in land value is tapped through increased revenue tax. West Bengal has formulated a system to capture gains from land use conversion. Area based Development charges are being resorted to in Andhra Pradesh, Gujarat, Maharashtra, Tamilnadu and Madhya Pradesh. Karnataka, Gujarat and Maharashtra have made enabling provisions for enabling Transfer of Development Rights to buy additional FSI/FAR.

Value Capture Methods

- **Land Value tax** – considered the most ideal value capture tool which apart from capturing any value increment, helps stabilize property price, discourage speculative investments and is considered to be most efficient among all value capture methods. Maharashtra and Tamilnadu, through state laws have expanded the scope of this mechanism to cover urban land also. Globally, land value tax is widely used in Denmark, Australia and New Zealand.
- **Fees for changing Land use (agriculture to non-agriculture)** – land revenue codes provide for procedures to obtain permission for conversion of land use from agriculture to nonagricultural use.
- **Betterment levy** – one-time upfront charge on the land value gain caused by public infrastructure investment.
- **Impact fees** are the fees levied from the owners with illegal construction to get them converted into authorized development.
- **Vacant Land Tax (VLT)** — applicable on those landowners who have not yet initiated construction on their lands. In Andhra Pradesh, the Greater Hyderabad Municipal Corporation (GHMC) imposes a tax of 0.5% of the registration value of the land if not used exclusively for agriculture purpose or is vacant without a building.
- **Tax Increment Financing (TIF)** — one of the most popular Value Capture tools in many developed countries, especially the United States. In TIF, the incremental revenues from future increases in property tax or a surcharge on the existing property tax rate is ring-fenced for a defined period to finance some new investment in the designated area. Tax Increment Financing tools are especially useful to finance new investments in existing habitations. Some of the Smart City Proposals have planned for TIF in their area-based developments (ABD).
- **Land pooling System (LPS)** — a form of land procurement where all land parcels in an area are pooled, converted into a layout, infrastructure developed, and a share of the land, in proportion to original ownership, returned as reconstituted parcels. In India, States such as Gujarat and Haryana have used land assembly programs where the owners agree to exchange their barren lands for infrastructure-serviced smaller plots. Gujarat has used these tools to guide the development of Ahmedabad city and its surrounding infrastructure.

Framework for application of VCF methods to projects

Project initiation - At the time of initiation of the project the rules and regulations governing Value Capture in the Union Territory need to be studied and possibilities.

Planning - The area of influence of the project will be the area in which land and property values are expected to increase due to project location. The starting point is the value impact assessment in the area of influence, which should form a part of the Detailed Project Report (DPR). Next, stakeholders who will benefit from the setting up of the project will have to be identified and consultations held with them right from the stage of project initiation.

Design and Strategy - The Value Capture methods for funding project need to be identified and these methods have to be put in place by the State Governments. This will include the type and number of VCF tools to be applied, methods of assessing, levying and collecting the incremental value generated, time period during which the VCF tools will be in operation, etc.

Execution and Operation - The value capture method for the project should be implemented and an efficient mechanism for monitoring of fund management put in place. Regular monitoring and evaluation of the project progress will have to be established and put in the public domain. Figure below gives the details of the steps to be taken by the Central/State Governments and their agencies at the time of doing project feasibility studies.

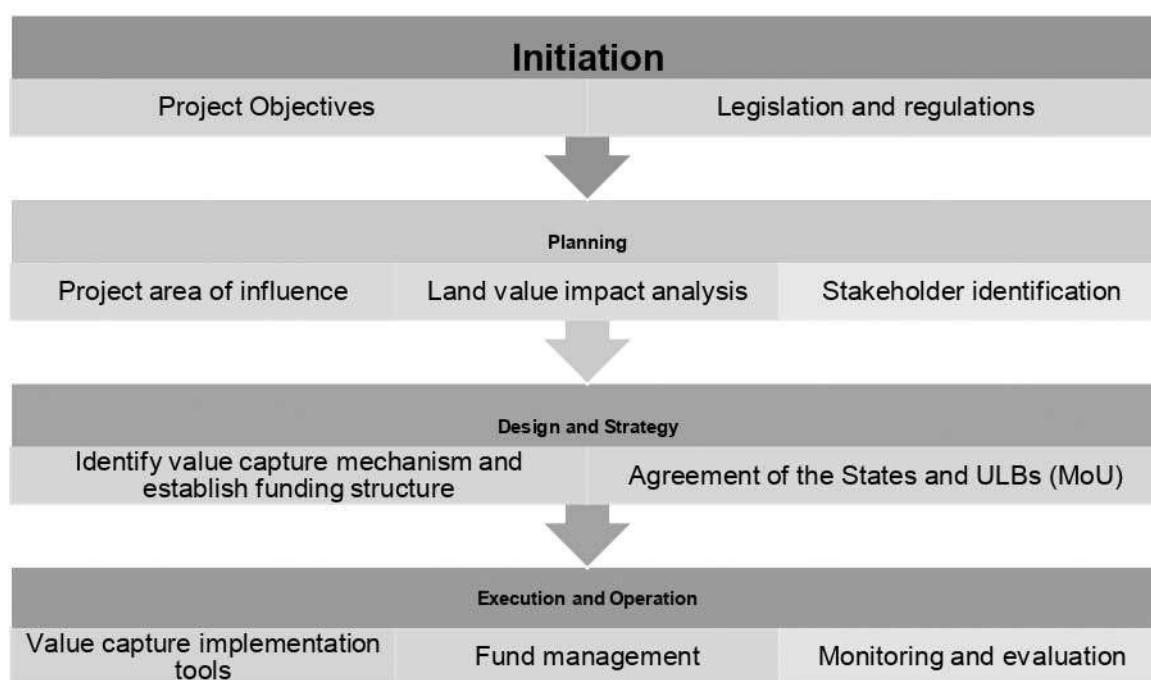


Figure 13-2 Steps required for Project based VCF policy framework

13.6 Urban Desing Guidelines

Urban design is the discipline through which planning and architecture can create or renew a sense of local pride and identity. It has great potential for enhancing the visual image and quality of Neighbourhoods by providing a three-dimensional physical form to policies described in a omprehensive plan. Urban design is process of giving shape to built environment which may address group of buildings of specific character, important streets public spaces etc. This will make urban areas functional, more attractive and sustainable. It focuses on design of the public realm, which is created by both public spaces and the buildings that define them. Urban design is done at various scales viz. at macro scale of urban structure in terms of planning/zoning, transportation and infrastructure networks to the micro scale in terms of street furniture, lighting etc. This section deals with urban design guidelines or certain important areas viz. core area of city, areas with environmental significance, special heritage areas etc. These guidelines direct the process of revitalization, planning, design and management of such areas.

13.6.1 Key Considerations for Entire GMPA 2045

Few considerations are stated below which are essential to arrive at a basis for formulating Urban Design guidelines for urban fabric:

Design Places for People: To make urban places more functional and acceptable these places must be safe, comfortable, vibrant, varied attractive and distinctive.

Design to Enrich Existing context: To enrich qualities and context of existing urban places. This means encouraging a distinctive response that arises from and complements its setting and applies at every scale region, city, town, neighbourhood and street.

Design to enhance accessibility: To make places easily accessible and which are well integrated physically and visually with its surroundings.

Work with Landscape: Design should be such as to strike a balance between natural and manmade environment and utilize each intrinsic resource and character viz. climate, landform, landscape and ecology

Design with Usage of Mixed Forms: Stimulating, enjoyable and convenient places meet a variety of demands from the widest possible range of users and social groups. The design element should weave together different building forms, uses and densities.

Economic Viability: For projects to be, developable and well cared for, they must be economically viable, well managed and maintained. This means understanding the market considerations of developers, ensuring long-term commitment from the community and the local authority, defining appropriate delivery mechanisms and seeing this as part of the design process.

Design for Change: Design needs to be flexible enough to respond and adapt to future changes in use, lifestyle and demography. This means designing for energy and resource efficiency; creating flexibility in the use of property, public spaces and the service infrastructure and introducing new approaches to transportation, traffic management and parking.

13.6.1.1 Vision

To guide physical development towards a desired scale and character that is consistent with the social, economic and aesthetic values of the City.

13.6.1.2 Urban Design Objectives

- To ensure that new development makes a positive contribution to sustainability and the urban fabric
- To enhance and protect the landscape qualities
- To enrich the distinct topographic and landscape qualities and characteristics of the town
- To ensure that all development responds positively to the existing patterns of urban form and character, the landscape qualities, historic and cultural elements and social dimensions and aspirations of the town.
- To reinforce the structure and image of the town as an attractive place to live, do business, recreate and as a tourist attraction.
- To ensure that the declared arterial network of transport and movement corridors makes a positive contribution to town's image.

13.6.1.3 Components of Urban Design

The following aspects need to be considered to arrive at the basis for policies affecting the urban fabric:

- Areas of significance in built environment.
- Visual integration of the city.
- Policy for tall buildings.
- Policy on unhindered access movement, parking and pedestrian realm.
- Policy on Hoardings, Street furniture and Signage.
- Urban Design Scheme.
- Policy for design of pedestrian realm.
- City structure plan and Urban Design objective.
- Policy for conservation of Heritage Precincts Buildings and Zones.

13.6.1.4 *Significant Areas of Built Environment*

In GMP, following significant areas are identified that needs special urban design consideration.

- New Housing/ neighbourhood development
- Waterfront Development – Brahmaputra River
- Heritage Development
- City Gateways
- Streetscapes

New Housing Schemes/ Neighbourhood Development

Built Character:

Group Housing is a cluster or group of attached homes around common lawns, gardens, or play areas. Such areas should provide residents with both private and common outdoor spaces. These common spaces can also foster social interaction amongst residents, between residents of Group Housing. This should be designed to maintain a sense of privacy yet to allow for interaction between neighbors. Yards and entry courtyards when abutting a street or common space should be separated through physical elements such as open or low fencing, screens, and low hedges or walls.

If pocket park areas are provided, they should reflect character of neighbourhood and contain elements such as lawn, children's play areas etc. When a Group Housing area is enclosed by neighbourhood scale streets, multiple perimeter or street corner gardens may connect multifamily residents with the surrounding neighbourhood better than internalized common space. If feasible these common spaces should be easily observable from unit windows. These common spaces share common area supervision responsibilities among a close-knit group of neighbors.

Category of Development

High rise low density The category is defined by the development where there is more of a marginal space between highrise buildings in form of pedestrianisation, recreational spaces, buffers etc. This kind of development shall be reviewed as Low density because per person to space ratio comparatively is higher.

High rise High density The category is defined by the development where there is a little marginal space between high-rise buildings. This kind of development shall be reviewed as high density because per person to space ratio is comparatively lower.

Low rise low density The category is defined by the development where there is more marginal space between low-rise buildings. This kind of development shall be

reviewed as Low density because per person to space ratio is comparatively high.

Low rise High Density The category is defined by the development where there is a little marginal space between low-rise buildings. This kind of development shall be reviewed as high density because per person to space ratio is comparatively low.

Following needs to be encouraged:

- For new Residential Development create edge or boundary conditions in neighbourhood for creating a sense of enclosure
 - Buildings along the street compatible with other neighbourhood types in the immediate vicinity.
 - Buildings which harmonize with the surrounding neighbourhood.
 - Parking areas removed from primary pedestrian zones.
 - Cluster of houses around a common open space with appropriate landscaping.
- Following needs to be discouraged:
- Buildings that don't relate physically or visually to adjacent shared spaces.

Circulation

The vehicular circulation system generally includes internal circulation drives with parking areas. Important streets should be enhanced with streetscapes and sidewalks. The experience of moving on these roads can be enhanced through use of various elements such as street lighting, roadside plantation, and development of important Junctions etc. Pedestrian circulation should be promoted through provision of walkways and direct connections to adjacent streets.

- For important routes being used by Tourists, devices such as information kiosks, directional signs and maps can be used to help tourists easily locate their destinations.
- For major roads, individual road solutions shall be given to complement abutting land uses with controlled densities, roadside plantation etc.
- Neighbourhood streets should be designed to provide safe and convenient access for vehicles and pedestrians and to relate to the type of neighbourhood and uses through which the streets travel. They should provide safe and attractive designs including composition of street landscaping with sidewalks/paths. neighbourhood streets can provide a visual experience and lower the speed of local traffic by aligning with a neighbourhood focal point such as a park, a fountain or a sculpture.
- Street patterns should interconnect and encourage easy access from one neighbourhood to another & also discourage high speed travel. Individual streets should maintain adequate travel ways for emergency and service vehicle access.

Following needs to be encouraged:

- Destination assistance devices such as information kiosks, and directional signs for tourists.

- Roads relating to a neighbourhood focal point such as a street passing by a pocket park, terminating at a vista point, or interrupted by a fountain.
- Visual screening of parking areas.
- Contiguous pedestrian routes.
- Interconnected but low speed neighbourhood streets.
- Landscaping in the right of way that relates to the adjacent uses.
- Perimeter road patterns compatible with the adjacent neighbourhood street system.
- Low speed traffic techniques such as intersection at focal points.

Following needs to be discouraged:

- Parking areas located between buildings and pedestrian oriented streets.
- Pedestrian circulation patterns that discourage walking to neighbors or community destinations.
- Random curvilinear streets.

Landscaping

Landscaping should be used to soften the mass of buildings and to provide usable common space for residents. The use of elements such as evergreen groundcover and small shrubs around common spaces can add variety and delineate boundaries while allowing for surveillance. When hard surfaces are predominant feature, visual relief and interest can be provided through use of plantations such as plants with flowers and special interest plants. Common park space should be located so that it is visible to residents and accommodate a variety of activities for differing age groups.

Following needs to be encouraged:

- Trees that provide year-round visual interest such as evergreen groundcover & hardy landscaping plantings.
- Landscaping solutions such as parks/gardens in large open areas which add depth and space.
- Elements such as low walls, fences, screens, or hedges to delineate outdoor spaces.
- Adequate use of garden lighting to accentuate landscaping and pathways in the evening.
- An uninterrupted flow of landscaping between buildings and the streets by placing elements
- Abutting streets, trails or common spaces fence styles, such as low or open fences that encourage interaction between private and public spaces.
- Paving solutions for driveways and public walkways that complement the architectural and landscape character of the area such as stone, masonry or concrete.

Following needs to be discouraged:

- High walls and solid fences adjacent to pathways or shared open space.

13.6.1.5 *Water Front Development*

There is scope for development of Brahmaputra waterbody using urban design tool, the existing image of these areas can be transferred into a new livable and environmental friendly image. While developing areas near water bodies the following urban design guidelines needs to be considered.

- Development around and adjacent to water bodies in Guwahati should be taken up in a sensitive manner.
- Integrated development on lakefronts with the natural environment to preserve and enhance views, and protect areas of natural drainage.
- Minimise grading to maintain the natural topography, while contouring any landform alterations to blend into the natural terrain.
- Screen development adjacent to natural features as appropriate so that development does not appear visually intrusive, or interfere with the experience within the open space system. The provision of enhanced landscaping adjacent to natural features could be used to soften the appearance of or buffer development from the natural features.
- Use building and landscape materials that blend with and do not create visual or other conflicts with the natural environment
- Design and site buildings to permit visual and physical access to the natural features from the public right-of-way.
- Encourage location of entrances and windows in development adjacent to open space to overlook the natural features.
- Protect views from public roadways and parklands to natural canyon, resource areas, and scenic vistas.
- Preserve views and view corridors along and/or into waterfront areas from the public right-ofway by decreasing the heights of buildings
- Provide public pedestrian, bicycle, and equestrian access paths to scenic view points, parklands, and where consistent with resource protection, in natural resource open space areas.
- Provide special consideration to the sensitive environmental design of roadways that traverse natural open space systems to ensure an integrated aesthetic design that respects open space resources. This could include the use of alternative materials such as “quiet pavement” in noise sensitive locations, and bridge or roadway designs that respect the natural environment.
- Special considerations should be given to the appropriate scale, height and disposition of building blocks along the waterfront to avoid blockage of sea/land breezes and prevailing winds.

13.6.1.6 Public Spaces

Public spaces include public plazas, squares or other gathering spaces in each neighbourhood center. neighbourhood centre is a geographically localised community within a larger city, where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community.

District centers, commercial areas, Public/ Semipublic and Recreational Areas in Master Plan demands Proper Campus Planning and care to maintain the protocol of the city.

Organised Informal Market/Food Plazas

To stop encroachment of all types of Informal markets, Master Plan have provided organized spaces for informal markets, hawkers, handicraft shops etc. these markets will be majorly located in District Centers and Core areas.

The informal and organized sector is a major source of employment in the economic fabric of the city for which the following approach is proposed:

- Earmarking of 'Hawking' and 'No Hawking' Zones at neighbourhood and cluster levels.
- The weekly markets to be identified and planned / developed.
- New areas for informal trade to be developed and integrated with housing, commercial, institutional and industrial areas.
- Provision of common basic services like toilets, water points, etc.
- Institutionalizing designs of stalls, push-carts and mobile vans.
- Design outdoor open areas as “outdoor rooms,” developing a hierarchy of usable spaces that create a sense of enclosure using landscape, paving, walls, lighting, and structures.
- Design such markets/ haats to accommodate a variety of artistic, social, cultural, and recreational opportunities including civic gatherings such as festivals, markets, performances, and exhibits.
- Consider artistic, cultural, and social activities unique to the neighbourhood and designed for varying age groups that can be incorporated into the space.
- Use landscape, hardscape, and public art to improve the quality of markets/ haats.
- Encourage the active management and programming of these markets.
- Design outdoor spaces to allow for both shade and the penetration of sunlight.
- Frame parks and plazas with buildings which visually contain and provide natural surveillance into the open space.
- Involvement of NGOs envisaged.
- Address maintenance and programming.

13.6.1.7 City Gateways**Road:**

- Non-residential public buildings with pleasing appearance should be located on entry corridors.
- Attractive landscape should be developed in accordance with the highway landscape norms.
- Segregation of goods and passenger vehicles at the entry point through separate lanes to improve the visual environment.

Rail:

- Enhancing visual experience for commuters through appropriate landscape along railway tracks. This can be done by growing colorful plantations along railway corridors, keeping wide grazing lands, mounting flags at the entry of railway stations.
- Reconstruction / redevelopment of existing stations should be undertaken through comprehensive Urban Design schemes.
- Attractive designs should be evolved for new stations.

Air:

- Designing landmarks, nodes, edges of the city in a manner that they can be recognized outstandingly in aerial views. This can be achieved by composing and contrasting scale, color, landscape of structure and boundary with surrounding area.
- Natural and built environment should be revitalized to give an impression of global city.
- The overall green cover in this zone should be enhanced and protected.

13.6.1.8 Streetscape**Hoardings & Signage:**

- Hoardings, sign boards, directional boards, bill boards, neon sign bards, balloons, banners etc. have become symbols of present day urban scape and important instruments of outdoor publicity and public information. These, if located properly and aesthetically, may enhance the visual quality of the city. Otherwise, these may cause hazards, obstruction and visual pollution etc.
- Design signage to effectively utilize sign area and complement the character of the structure and setting
- Architecturally integrate signage into design.
- Include pedestrian-oriented signs to acquaint users to various aspects of a development.
- Place signs to direct vehicular and pedestrian circulation.
- Post signs to provide directions and rules of conduct where appropriate behavior control is necessary.
- Design signs to minimize negative visual impacts.
- Address community-specific signage issues in community plans, where

needed.

- A major cause for present day chaos on the roads is that the road infrastructure, signage and road markings are not in accordance to the standards laid down by the Motor Vehicle Rules and Highway Code.
- Safety of road users shall be one of the prime consideration while planning / designing of road network and infrastructure.
- Appropriate road signage and markings are excellent means of educating road users about road safety rules and road discipline and add to the road beautification. These prevent the deviant behaviour of motorists and at the same time provide useful route related information.
- Concerned road owning agencies shall be responsible for installing the appropriate road signage and markings on regular basis.

Street Furniture:

- Public art is an important part of the urban spatial experience, which can be incorporated in the form of functional objects such as street furniture and paving designs.
- Street furniture should be designed sensitively considering the land use, intensity of activity and other identified design districts. Their design must also reflect respect to pedestrians and physically challenged people.
- Access provisions for the physically challenged should be made from the street to overcome curb heights, rain water gratings etc.
- Locate street trees in a manner that does not obstruct ground illumination from streetlights.
- Shade paved areas, especially parking lots.
- Parking spaces close to the entrance should be reserved for physically challenged.
- Exclusive parking bays are proposed near major intersections as part of road R/W with adequate landscaping to provide for parking of mobile repair vans, PCR vans, ambulances, cranes, fire tenders and other public utility vehicles.

Street Frontage:

- Create street frontages with architectural and landscape interest to provide visual appeal to the streetscape and enhance the pedestrian experience.
- Locate buildings on the site so that they reinforce street frontages.
- Relate buildings to existing and planned adjacent uses.
- Ensure that building entries are prominent, visible, and well-located.
- Maintain existing setback patterns, except where community plans call for a change to the existing pattern.
- Establish or maintain tree-lined residential and commercial streets. Neighbourhoods and commercial corridors in the town that contain tree-lined streets present a streetscape that creates a distinctive character.
- Minimize the visual impact of garages, parking and parking portals to the pedestrian and street façades.

Pedestrian Friendly City:

- Major work centres, where large number of pedestrian networks emerge and culminate, should have enhanced facilities for the pedestrians.
- This will lead to more sensitive and intricate design of street furniture, making major image able components part of daily urban experience.
- Design landscape bordering the pedestrian network with new elements, such as a new plant form or material, at a scale and intervals appropriate to the site. This is not intended to discourage a uniform street tree or landscape theme, but to add interest to the streetscape and enhance the pedestrian experience.
- Use effective lighting for vehicular traffic while not overwhelming the quality of pedestrian lighting.
- Pedestrian networks affect spaces in a very distinctive way.
- Establishment of pedestrian networks in any area reveals its vitality.
- They provide richness in terms of spatial experience and community interaction etc.

Transit Integration:

- Provide attractively designed transit stops and stations that are adjacent to active uses, recognizable by the public, and reflect desired neighbourhood character
- Design safe, attractive, accessible, lighted, and convenient pedestrian connections from transit stops and stations to building entrances and street network
- Provide generous rights-of-way for transit, transit stops or stations.
- Locate buildings along transit corridors to allow convenient and direct access to transit stops/stations.

Parking:

- Reduce the amount and visual impact of surface parking lots
- Encourage placement of parking along the rear and sides of street-oriented buildings.
- Avoid blank walls facing onto parking lots by promoting treatments that use colors, materials, landscape, selective openings or other means of creating interest.
- Design clear and attractive pedestrian portico/pathways and signs that link parking and destinations.
- Locate pedestrian pathways in areas where vehicular access is limited.
- Avoid large areas of uninterrupted parking especially adjacent to community public view sheds.
- Build multiple small parking lots in lieu of one large lot.
- Retrofit existing expansive parking lots with street trees, landscape, pedestrian paths, and new building placement.
- Promote the use of pervious surface materials to reduce runoff and infiltrate storm water.
- Use trees and other landscape to provide shade, screening, and filtering of storm water runoff in parking lots.

Utilities:

- Minimize the visual and functional impact of utility systems and equipment on streets, sidewalks, and the public realm.
- Convert overhead utility wires and poles, and overhead structures such as those associated with supplying electric, communication, community antenna television, or similar service to underground.
- Design and locate public and private utility infrastructure, such as phone, cable and communications boxes, transformers, meters, fuel ports, back-flow preventors, ventilation grilles, grease interceptors, irrigation valves, and any similar elements, to be integrated into adjacent development and as inconspicuous as possible.
- To minimize obstructions, elements in the sidewalk and public right of way should be located in below grade vaults or building recesses that do not encroach on the right of way (to the maximum extent permitted by codes).
- If located in a landscaped setback, they should be as far from the sidewalk as possible, clustered and integrated into the landscape design, and screened from public view with plant and/or fence-like elements.
- Traffic operational features such as streetlights, traffic signals, control boxes, street signs and similar facilities should be located and consolidated on poles, to minimize clutter, improve safety, and maximize public pedestrian access, especially at intersections and sidewalk ramps. Other street utilities such as storm drains and vaults should be carefully located to afford proper placement of the vertical elements.

13.6.1.9 *District Centres*

A District Centre has been envisaged as a multiple service providing campus, catering to surrounding urban area. The core commercial area such as Wholesale markets, shopping complexes, office buildings, etc. shall be reviewed as a District Centre. The similar definition does not imply to the informal markets but if the informal markets are part of any above category that shall be reviewed and organized in District centre. There are few common components that should be dealt through Urban Design perspective to maintain and enhance the ultimate urban character and image.

1. Landscape
2. Parking
3. Pedestrian Movement
4. Public Spaces
5. Unique Building Character

General Guidelines:

- The area provided for landscape as part of the district centre should weave through the entire district centre to create a pleasant environment.
- Detailed Urban Design and Landscape Schemes should be prepared to integrate Public Transport Terminals, safe pedestrian walkways, parking areas, recreational and cultural areas, etc.
- The envelope, FAR, architectural features of the District Center buildings should be merged with surrounding area.
- A certain percentage of open area should be made mandatory in district center design so that it can be used as recreational area, exhibition purpose or any local festivals.
- Continuity of the sidewalks should be maintained in terms of the width, surface treatment, curb cuts, tree and street furniture locations, for the pedestrians and disabled.
- A district centre should be accessible from the surrounding residential areas through the pedestrian approach or by subways etc. The intermediate public transport should be introduced to increase the mobility within the City Centre.
- An adequate parking should be provided in District Center.
- Provision of common basic services like Public toilets, water points, etc.
- Signage and lighting: for visual accessibility, district center should be provided with proper lighting system and signages. As Guwahati is tourist destination, signages in English as well as Hindi should be promoted.
- Use of alternative renewable sources of energy should be encouraged for new buildings (especially those of commercial or institutional nature), traffic signals and public signage, etc
- Planned district centres in city (forming a multi nodal city structure) can be best utilized for creating public spaces and through these, District Centers City will be livelier, inviting and livable.
- As per the proposal of Govt. of India, few free wi-fi zones should be provided in order to encourage the Digital India.

13.7 Urban Reforms

The Ministry of Housing and Urban Affair has introduced an outcome-based incentive scheme or reform linked to the transfer of funds in which states will get the funds after implementation of the schemes. The proposals will be sent to the department of expenditure for consideration. If approved, the state government will be given an incentive for implementing these schemes.

To achieve the objectives of the scheme, the most important area of reform in the urban planning ecosystem are legal provisions, strengthen capacity of planning personnel, designation of authority to undertake planning, enlisting processes to be followed and building awareness among the community.

The urban development reform schemes include modernisation of building bye-laws, transit-oriented development (TOD), allowing transferable development rights (TDR), preparation of local area plans and town planning schemes, creation of sponge cities by integrating blue and green infrastructure.

13.7.1 Key Urban Reform considerations for GMPA 2045

1. Implementation of town planning scheme/ land pooling scheme;
2. Green and Blue infrastructure;
3. Promoting affordable housing and in-situ slum rehabilitation;
4. Transportation network/Mobility plan: Proposals for new roads (RoW 18 mts or more);
5. Economic Planning: Eco activities, resources & linking with transport network;
6. Transit Oriented Development (TOD) for densification and ease of mobility;
7. Transferrable development rights (TDR) as a planning tool;
8. Strengthening natural ecosystem of urban areas through urban planning;
9. Land use plan
10. Urban Forestry

13.7.2 Local Area Plan and Town Planning Scheme

Adoption of Local Area Plan (LAP) and Town Planning Scheme (TPS)/ Land Pooling Scheme for brown field redevelopment and greenfield development of the city. These schemes promote orderly urban expansion, creates supply of serviced land, improves land market, and generate finance for urban Local Bodies/ Development Authorities by creation of land banks. It facilitates and promotes collaboration and increases avenues for Public-Private Partnership (PPP) to create world class urban infrastructure.

Under this initiative one LAP and one TPS have been taken up under AMRUT urban reform program withing GMDA area for brown field and green field development. The core city area of Guwahati, mainly known as Fancy Bazar area, is being redeveloped by Local Area Plan and the green field area of Maliata village is being developed by TPS as a state pilot project.

The proposed LAP and TPS are as mentioned in table further.

Table 13-3 Proposed LAP & TPS

Sr. No.	LAP	Site Location	TPS	Site Location
1	LAP 1	Fancy Bazaar	TPS 1	Maliata
2	LAP 2	Ulubari and Sarania Hills	TPS 2	No.2 Singimari
3	LAP 3	North Guwahati	TPS 3	No.3 Singimari, Raoumari
4			TPS 4	N0.1 Gandhmow

13.7.3 Green and Blue Infrastructure

Green and Blue Infrastructure refers to a network that provides the “ingredients” for solving urban and climatic challenges by a combination of infrastructure, ecological restoration and urban design to connect people with nature. Blue elements indicates water bodies such as rivers, canals, ponds, wetlands, floodplains, water treatment facilities, and green elements, such as trees, forests, fields and parks, in urban and land-use planning.

Benefits of Green and Blue Infrastructure:

Environmental benefits: Utilising blue-green infrastructure in sectors such as transportation, water, and housing can improve ecosystem health, thereby improving human health and the environment. Incorporating green infrastructure in the city will not only benefit humans but also nature.

Social benefits: The design and beauty of the landscape can contribute to the identity of the city's character. Green streetscapes and landscapes enhance aesthetic and ethical qualities. Blue-green infrastructure can provide shelter in public spaces and reduce the urban temperature and increase outdoor activities which encourage more social gatherings.

Economic benefits: Implementing blue-green projects in the city may also help the citizens economically. Due to low temperature on building surfaces, it diminishes the cooling demand which results in decreasing energy needs. The life expectancy of the building increases as green infrastructure will protect it from high temperatures, help in lowering maintenance costs, etc.

Infrastructure planning must become more sensitive to ecological considerations by developing and adapting nature-based solutions to meet climate and sustainability goals, a purpose served by blue-green infrastructure. ***Smart Cities Mission and Atal Mission for Rejuvenation and Urban Transformation (AMRUT)*** are some good steps in this direction.

13.7.3.1 *Sponge city*

Sponge city is one of the good urban reforms to make cities flood free. A sponge city is one that acts like a sponge, soaking up and retaining water during rain and storms and releasing it slowly. The idea borrows concepts from prior low-impact development approaches from around the world, and the term “sponge city” was popularized in the PRC (People's Republic of China) since 2013. A national government program supporting pilot sponge cities started in 2015, and a directive requesting all cities to prepare sponge city master plans followed in 2017. Developing a sponge city helps respond to four key water challenges facing highly urbanized areas in the PRC: too much water, too little water, polluted water, and muddy water.

Sponge cities aim to improve management of local water cycles. Rainwater and stormwater is managed locally as opposed to being centralized for the whole city. Management of flood risk, water scarcity, and pollution are integrated. When planning a sponge city for an urban area, climate change and the extreme storms, longer dry periods, and extreme heat it causes should be considered. One main principle is to use functionally designed green spaces, such as wetlands, floodplains, and gentle embankment slopes, to increase detention and flow capacity to improve management

of river flooding. To improve management of urban flooding, green infrastructure is applied, designed to retain and decelerate stormwater before it flows into drainage.

As per the MoHUA, GoI Urban Reforms program, State Govt. of Assam has initiated the Sponge City project for 4 cities with population above 1 Lakh - Guwahati, Nagoan, Silchar and Dibrugarh have been taken up.

The objectives are:

1. Creation of Blue-Green Infrastructure with

- Protect & improve waterways, waterbodies & water resources
- Reduce the risk of urban flooding
- Adopt water sensitive planning for new developments
- Increase overall resilience & water security for citizens

2. Integrated Water Management Plan

- Increase potable water sources: extraction and treatment from the Brahmaputra River for potable uses.
- Expanded use of non-potable water sources including: Rainwater tanks on larger buildings, commercial and industrial locations; shallow groundwater with fresh water in the rainy season; Recycled water.
- Improve flood detention- rejuvenation of water bodies, ground water recharge, storm water harvesting.
- Improve groundwater quality by reducing infiltration of untreated sewage

3. Water Bodies Conservation/Rejuvenation Plan

A list of potential waterbody rejuvenation projects has been identified to begin within the next five years.

S. No	Name of waterbody	Project description
1	Silsako Beel and Bondajan Channel	Rejuvenation, Bioremediation and Sustainable Conservation of Silsako Beel and Bondajan Channel
2	Bharalu River	Rejuvenation of Bharalu River
3	Mora Bharalu channel	Rejuvenation of Mora Bharalu channel
4	Basistha River	Rejuvenation of Basistha River
5	Borsola & Sarusola Beel	Rejuvenation of Barsola & Sarusola Beel
6	Deepor Beel	Protection & conservation of Deepor Beel

4. **Framework of the policies-Water conservation and treated wastewater reuse policy; Rainwater harvesting policy.**

Water Body Rejuvenation

The Guwahati Water bodies (Preservation and Conservation) Act 2008 and 2010) notified water bodies i.e. Deepor, Silsako, Borsola-Sorusola and Bondajan

S. No	Name of Water Body	Latitude	Longitude	Area (ha)	Condition of Water body
1	Dipar Beel	26.117775°N	91.649358°E	4,014	Clean and in good condition (but increasing threats from solid waste, wastewater and stormwater)
2	Borsola Beel	26.173629°N	91.746422°E	10	Sewage affected and in bad condition
3	Sarusola Beel	26.173629°N	91.746422°E	2	Sewage affected and in bad condition
4	Silsako Beel	26.148850°N	91.817947°E	150	Sewage affected and in bad condition. Partially recovered
5	Bondajan Channel	26.189955°N	91.841831°E	50	Sewage affected and in bad condition

1. Silsako beel and Bondajan Channel

Silsako is a natural wetland of Guwahati City, the second biggest water retention reservoir for a catchment area of 50 Sqkm. It acts as a natural drainage to carry rain water of Guwahati city. The beel is the outfall area of 3 rivers channels and 7 drains including the Meghalaya catchment area.

In the initial stage of the project work in Guwahati, Bondajan channel waterbody rejuvenation work is taken up. Waterbody restoration will be done by mentioned three components.

- Rejuvenation of the channel and treatment of the water body with bioremediation process;
- Increase of the retention capacity of the channel for city Sponge effect and for the city flood management;
- Ground water recharge with creation of recharge points;

Silsako, a natural wetland in Guwahati City. Hydrologically the Beel receives surface runoff from its 50 sq km catchment. Water flows from the beel to Brahmaputra River via Bondajan channel approx 7 km downstream.

The beel acts as water reservoir with outfall from two of the major water channel viz Juri & Bahini river originating from Meghalaya hills and Seven other city drains carrying storm water and sewer.

The SilsakoBeel was notified as a wetland by Government of Assam under the Guwahati Waterbodies (Preservation and Conservation) Act 2008

Issues:

- **Highly Polluted:** The National Green Tribunal, vide an order in 2018 (Case 673/2018)categorised the Beel as highly polluted and placed it under Priority-I for improvement of it's water quality.
- **Encroachment:** The Beel has no physical boundary and over the years there was large-scale encroachment which has reduced the Beel to approx 80 acres by 2021.
- **Threat to Biodiversity:** The ecology of the waterbody was impacted by large inflow of untreated sewage water and the uncontrolled growth of the invasive hyacinth plant.
- **Contribution in Urban flood:** Due to shrinkage of water body and retentioncapacity the issue of flood aggravated in the surrounding area of the Beel and the city area.

Action Plan:

- **DPR:** The DPR for the Rejuvenation, Bioremediation and Sustainable Conservation of SilsakoBeel, Guwahati is prepared for project cost Rs 250.68 crore. The DPR has been submitted to Ministry of Jal Shakti for funding under theNational River Conservation Plan in 15th Oct., 2022
- **Rejuvenation of the beel is ongoing with:**
 1. **Removal of encroachment.** 499 nos unauthorized houses were demolished. Recovered the lake area to 200 cares. Govt. To rehabilite the effected families affordable housing for 200 families in the 1st Phase-shall be constructed. There is also provision for monetary compensation.

2. Excavation of the Beel and creation of large urban lake of capacity 3.5 Million Cubic meter for retention of the storm water and recharge of the ground water, urban flood mitigation. Installation of ground water monitoring system by Central Ground Water Board, Gol is on progress.
 3. Cleaning & Desilting of the water body, removal of hyacinth for continuous treatment of the water body.
 4. Creation of separate wastewater channels to control the infiltration of wastewater.
 5. Bioremediation treatment
 6. Plantation along the beel
- Removal of encroachment
 1. Total Sisako beel revenue Area: 450 acres
 2. Land area under encroached 369 acres
 3. Land recovered till date: 200 acres about 471 families were evicted.
 4. Planned for recovery of about another 42 acres
 5. Total wetland area targeted by end 2023 is 250 acres.



Figure 13-3 Silsako beel and Bondajan channel restoration and redevelopment

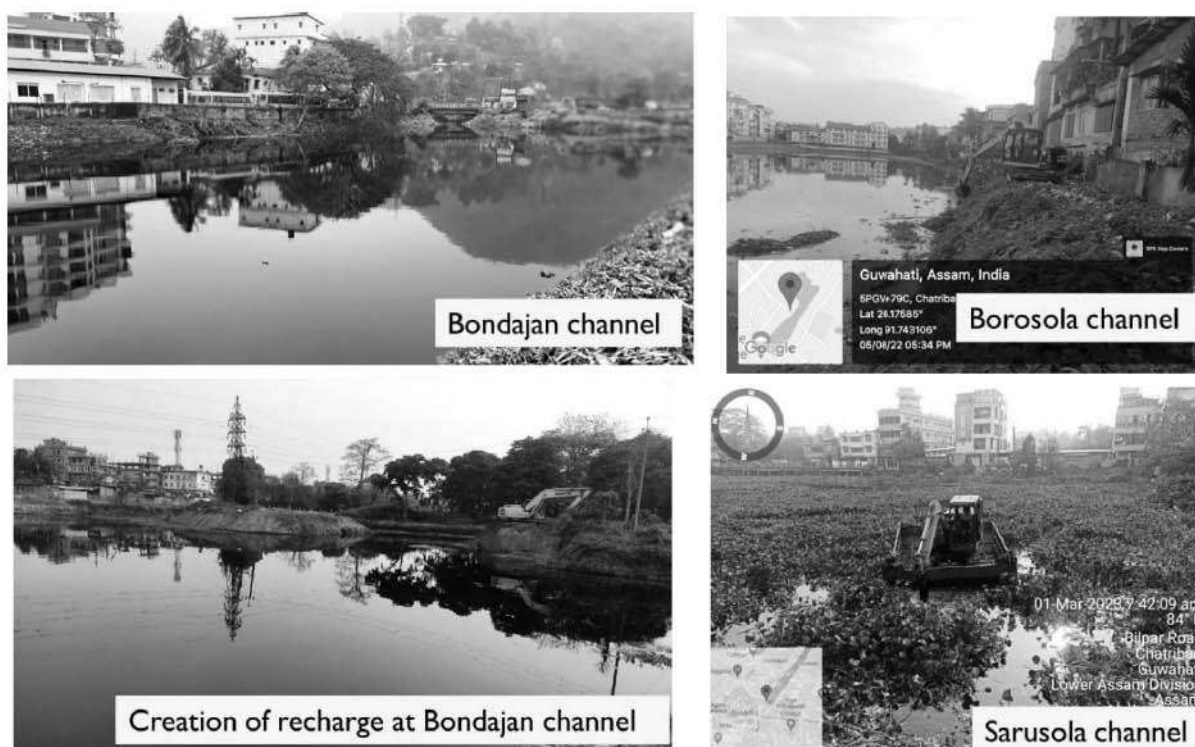


Figure 13-4 Cleaning & Desilting of water bodies/storm water channels

13.7.3.2 Proposed water body redevelopment models

1. Basistha riverfront/ canal front development

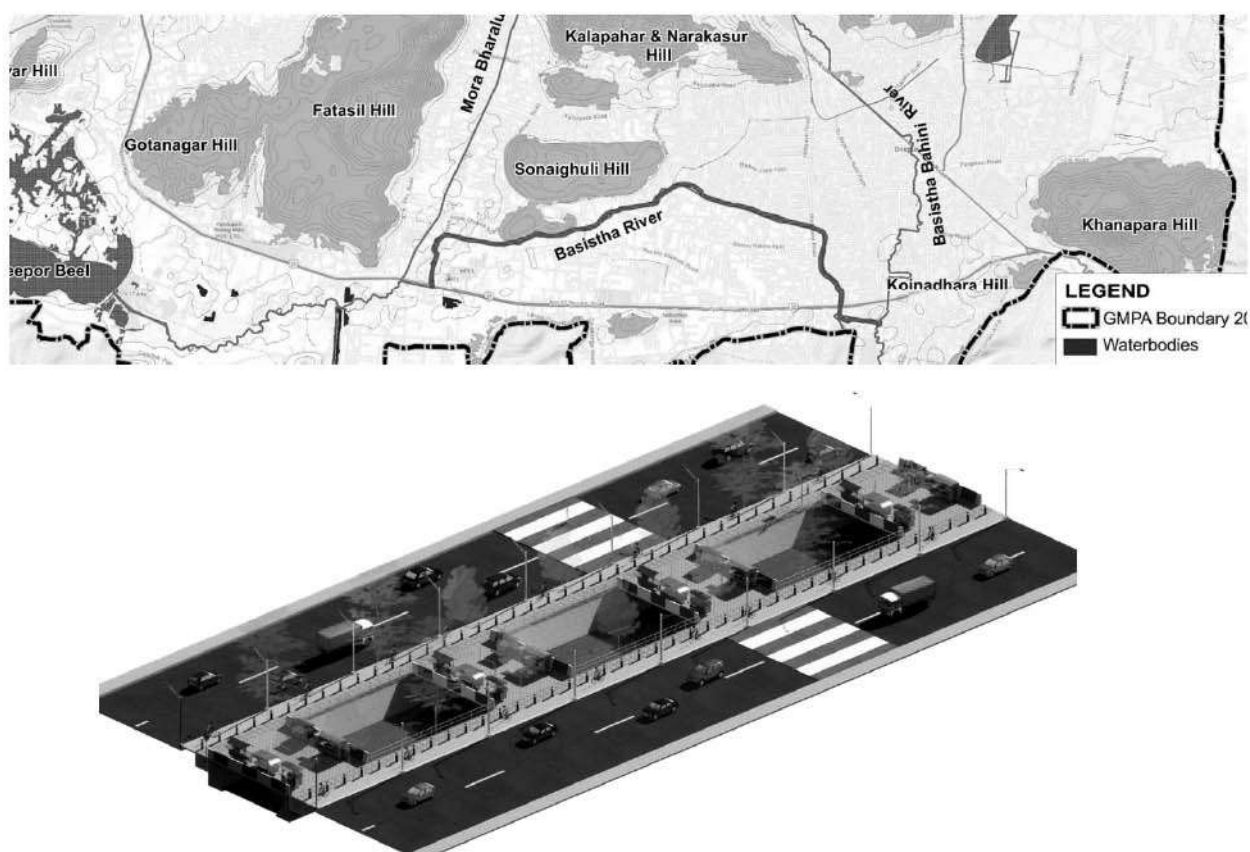


Figure 13-5 Proposed Basistha riverfront development model

2. Redevelopment of Digholi Pukhuri

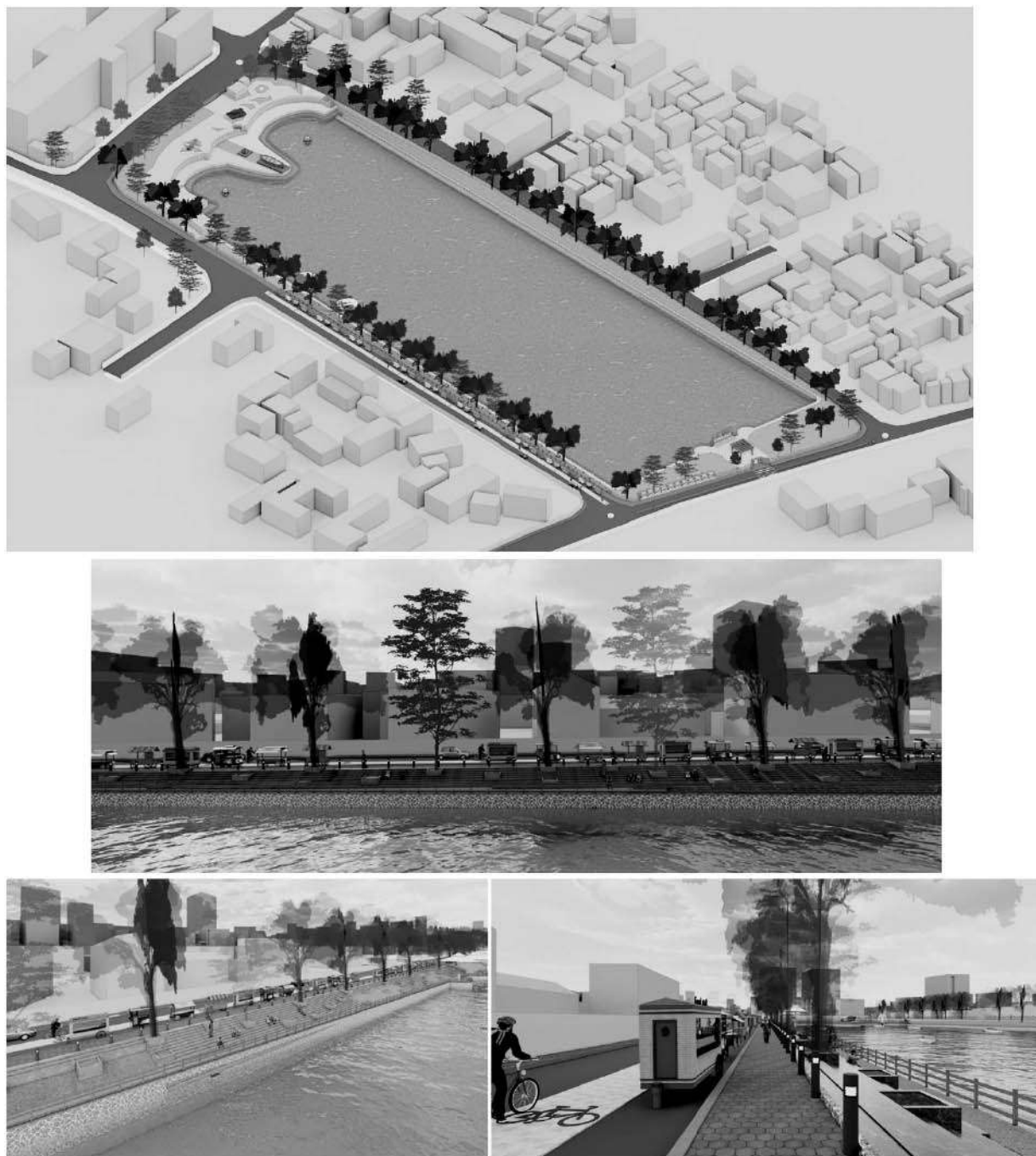


Figure 13-6 Proposed Digholi pukhuri redevelopment model

13.7.4 Promoting affordable housing and in-situ slum rehabilitation

As per the housing demand projection study mentioned in Chapter 6 section 6.9, there will be additional requirement of 7,49,476 housings by year 2045. As per the Ministry of Urban Poverty and Alleviation the population is categorised based on the income level such as Economically Weaker Section (EWS), Low Income Group (LIG), Medium Income Group (MIG) and High-Income Group (HIG). Study indicates the housing shortage for 2045 is calculated for each classification based on income level. Consideration of 20% housing demand for EWS and 30% for LIG will help to earmark the affordable housing in the Guwahati Planning Area. The total housing demand for affordable housing will be approx 3,74,738.

"In-situ" slum rehabilitation using land as a resource with private participation for providing houses to eligible slum dwellers is an important component of mission "Housing for All". This approach aims to leverage the locked potential of land under slums to provide houses to the eligible slum dwellers bringing them into the formal urban settlement. Slums so redeveloped should compulsorily be denotified.

Eligibility

- Slums, whether on Central Government land/State Government land/ULB land, Private Land, should be taken up for "in-situ" redevelopment for providing houses to all eligible slum dwellers.
- Eligibility of the slum dwellers like cut-off date etc. will be decided by States/UTs preferably through legislation.

Highlights

- Additional Floor Area Ratio (FAR)/Floor Space Index (FSI)/Transferable Development Rights (TDR) for making slum redevelopment projects financially viable.
- Slum rehabilitation grant of Rs. 1 lakh per house, on an average, would be admissible for all houses built for eligible slum dwellers in all such projects.
- Beneficiary contribution in slum redevelopment project, if any, shall be decided and fixed by the States/UTs Government.
- State/UT Governments and cities would, if required, provide additional Floor Area Ratio (FAR)/Floor Space Index (FSI)/Transferable Development Rights (TDR) for making slum redevelopment projects financially viable.

- States/UTs will have the flexibility to deploy this central grant for other slums being redeveloped for providing houses to eligible slum dwellers with private participation, except slums on private land. It means that States/UTs can utilise more than Rs. 1 lakh per house in some projects and less in other projects but within overall average of Rs. 1 lakh per house calculated across the States/UTs.
- The per house upper ceiling of central assistance, if any, for such slum redevelopment projects would be decided by the Ministry.
- States/UTs may decide whether the houses constructed will be allotted on ownership rights or on renewable, mortgageable and inheritable leasehold rights.
- States/UTs may impose suitable restrictions on transfer of houses constructed under this component.
- "In-situ" redevelopment of slums on private owned lands for providing houses to eligible slum dwellers can be incentivised by State Governments/UTs or ULBs by giving additional FSI/FAR or TDR to land owner as per its policy. Central assistance cannot be used in such cases.
- A viable project would have two components i.e. "slum rehabilitation component" which provides housing along with basic civic infrastructure to eligible slum dwellers and a "free sale component" which will be available to developers for selling in the market so as to cross subsidize the project.

Considering the provisions of different Govt. schemes and to take advantage, the land reservation for Affordable housing is proposed in Guwahati Master Plan 2045 at villages like, No.3 Singimari, No.1 Gundhmow, Matikutuni, Rajapanisanda, Deurali and Lochana.

13.7.5 Transportation network/Mobility plan: Proposals for new roads;

To decongest the core city area some of the major transforms have been discussed and agreed to implement in the city. Development of ring roads within and around planning area is one of the major transforms to be given priority.

13.7.5.1 Development of Ring Roads

Ring roads will be developed in Four tier, 1. Central Core Ring Road, 2. Inner Ring Road, 3. Intermediate Ring Road and 4. Outer Ring Road. Except outer ring road rest of three ring roads fall within the planning area. The alignment and connectivity of ring roads are as mentioned in below figure 13-9.

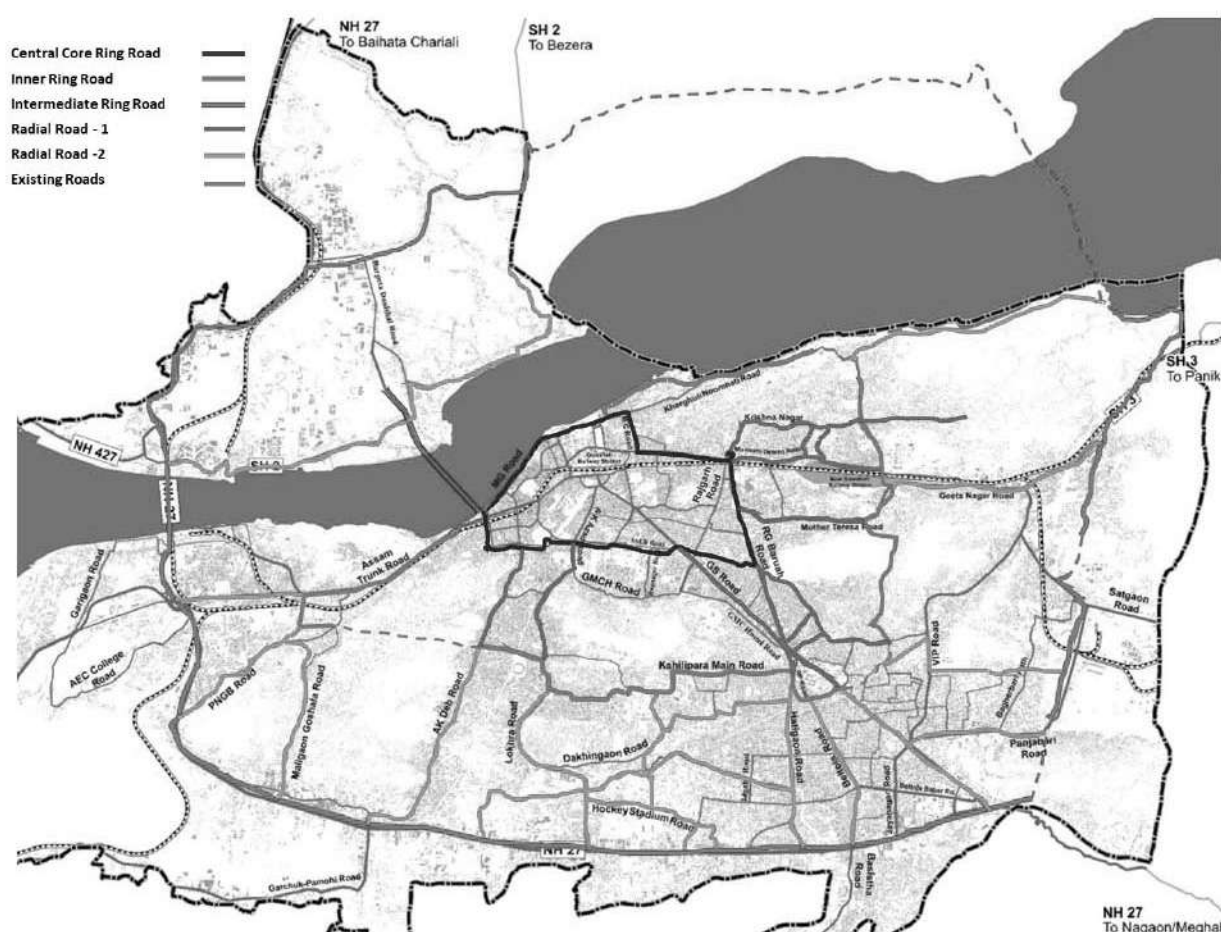


Figure 13-7 Proposed ring roads in and around Guwahati planning area

Central Core Ring Road: The inner most Central core ring road connects all major arterial roads of the city and generates central loop around core CBD area of Guwahati. The roads which are connected by Central core ring road are, MG road, AT

Road, AK Deb Road, Lokhra Road, GS Road, RGB Road, MD Road and Kharguli-Noonmati road. The Central core ring road has been proposed for 24mt widening for better carrying capacity of central traffic.

Inner Ring Road: The inner ring road further connects major arterial and sub-arterial roads of the city and generates inner loop around core city area of Guwahati. The roads which are connected by inner ring road are, PNGB Road, AT Road, MG Road, Refinery Road, AK Deb Road, Lokhra Road, Kahilipara main road, Secretariate road, Khagen Mahanta Road, Geeta nagar road, GS Road, RGB Road and MD Road. The inner ring road has been proposed for 24mt of widening by linking the roads Secretariate road and Mahapurush Madhabdeb path for better serviceability.

Intermediate Ring Road: The intermediate ring road further extends outwards and connects north Guwahati to south Guwahati by NH 27 as a major arterial road via new link roads connecting Panjabari road, Geetanagar road, SH 3, SH 2 via additional bridge on Brahmaputra to NH 27 on north. The intermediate ring road has been proposed for 60mt of widening for serving the purpose of through traffic majorly of HMV without entering the core city Guwahati.

13.7.5.2 *Proposal for road widenings*

To make the street network better and safer for people walking, biking, driving, riding transit, and moving actively with assistive devices—making your town a better place to live.

Proposed Road widening on NH

Table 13-4 Proposed road widening on NH

Sl no.	Name & route of the road (NH)	Type of road	Length of the Road (km)	Existing ROW (m)	Proposed ROW (m)
1.	Bongara to Kahikuchi	NH 17	2.50	12	45
2.	Rani to Kalitakuchi (VIP Airport Road)	NH 17	1.00	40	45
3.	Jalukbari to Rani	NH 17 (Bypass)	11.50	28	45
4.	Jalukbari to Lankeshwar	NH 17	2.00	15	45
5.	Amingaon to Hajo	NH 427	8.00	20	45
6.	Amingaon towards Rangia	NH 27	11.50	24	60
7.	Saraighat Bridge	NH 27	1.39	18	45
8.	Jalukbari To Saraighat Bridge	NH 27	1.50	40	60
9.	Khanapara to Jalukbari	NH 27	17.50	60	60

Proposed Road widening on SH

Table 13-5 Proposed road widening on SH

Sr. No.	Name of the road (SH)	Type of road	Length of the Road (km)	Existing ROW (m)	Proposed ROW (m)
1.	Amingaon towards Bezera	SH 2	14.20	18	30
2.	Narengi to TinTukura Road	SH 3	4.50	25	60
3.	Dadara hajo to Amingaon	SH 41	6	12	45

Proposed Road widening on Collector and Distributor road

Table 13-6 Proposed road widening on Collector road

Sl no.	Name of the Roads	Route	Length of Road (km)	Existing ROW (m)	Proposed ROW (m)
1	G S Road	Khanapara to Paltan Bazar Bus Stop	9.70	30	-
		Paltan Bazar Bus Stop to Paltan Bazar Police Station	0.23	22	24
2	A. T. Road	Paltanbazar Police Station to Bharalumukh Traffic Signal	2.23	20	24
		Bharalumukh Traffic Signal to Maligaon	1.29	20	24
		Maligaon to Jalukbari Flyover	2.30	30	30
3	R G B Road	Ganeshguri to Chandmari Flyover	4.33	24	24
4	V I P Road	Sixmile Flyover to Narengi Tiniali	6.28	30	30
5	Dr. B Barooah Road	Ulubari Flyover to Guwahati Club	1.16	12	15
6	GMCH Road	Ganeshguri to GMC Auditorium	2.39	10	15
		Rupnagar L P School to Birubari Tiniali Chowk	2.40	12	15
		Bhangaghar Flyover to Rupnagar L P School	0.65	30	30
7	Beltola Bazaar Road	Khanapara Veterinary to Beltola tiniali	2.25	24	24
8	Lokhra Road	Kalapahar to Birubari Tiniali	2.15	18	24
		Lokhra Chariali to kalapahar	3.83	20	24
9	Dr. B K Kakati Road	Ulubari Flyover to ASEB Road	0.81	15	15
		ASEB Road to Sarabhathi Chowk	0.75	12	15
10	Maniram Dewan Road	Noonmati Flyover to Guwahati Refinery Mural	1.67	20	24

		Guwahati Refinery Mural to Chandmari Flyover	2.91	15	24
		Chandmari Flyover to Guwahati Club	1.81	18	24
11	A K Dev Road	Garchuk Charali to Kumarpar	7.24	15	24
12	A K Azad Road	Birubari Tiniali to Nepali Mandir	7.24	18	24
13	M G Road	Bharalumukh Traffic Signal to Sukreshwar Devalay	1.97	24	24
		Sukreshwar Devalay to Guwahati Planetarium	1.05	16	24
14	A S E B Road	Dr. B K Kakati Road to ABC	1.20	12	24

Proposed Roads (New / Missing Linkages)

Table 13-7 New Proposed Road

Sr. No.	Name of the road (SH)	Length of the Road (km)	Existing ROW (m)	Proposed ROW (m)
1.	Road starting from GS road parallel to Bharalu river up to RGB Road	1.5	6	24
2.	Road from Secretariate Supermarket flyover to by lane no. 9 road	1	20	24
3.	Road from Taltala main road to Satgaon main road at Noonmati Cantonment	1.2	-	60
4.	Tunnel road from Panjabari road to NH-27	2	-	60
5.	Tunnel road from ACA stadium road to Railway colony	2.5	-	24
6.	Elevated canal road	7.6	-	30

13.7.6 Economic Planning: Eco activities, resources & linking with transport network

The overall development and opportunities in a town depend on the level of economic activities in an area. Considering the scenario that the Workforce Participation Rate (WPR) will increase as the Master Plan 2045 projects will be implemented and more job opportunities will be created, the employment projection is calculated. As per the study made under section 3.7 of the Chapter-3, Economic base and employment, and after consecutive discussions with various govt. departments, the employment projection is worked out based on the optimistic scenario. Thus, the workforce participation rate for year 2045 is coming around 44.29%, which was 39.12% in year

2011 as per Census 2011. The total projected working population in Guwahati Master Plan area for the horizon year 2045 is 1711282. Out of which, primary sector contributes to 92,511 which is about 57.9%, secondary sector contributes to 4367 of about 2.7% and about 62,836 of about 39.3% is contributed by tertiary sector.

Guwahati being an only Metropolitan area of state Assam, the steady growth in the tertiary working population is projected considering increasing opportunity in the Trade, Tourism, Hotels & Restaurants, Transport, Storage & Communication, Banking and Informal sector.

Major economic activities are planned and promoted along the major arterial corridors of the city as a mixed use and commercial development. This also admires less trip generation due to presence of economic activity in the vicinity of considers and also gives easy access to dwelling citizens by connecting to public transport like buses and proposed metro rapid transit networks.

Total 6.55 sq.km of area along NH 27 about 300 meter of influence on both sides of these roads are proposed as a Mixed Use zone. 200 to 150 meter of influence along Lokhra road, VIP road, Hatigaon road, Beltola road and Maligaon road. Total 30.82 sq.km of area is proposed in GMPA as a Mixed Use Zone.

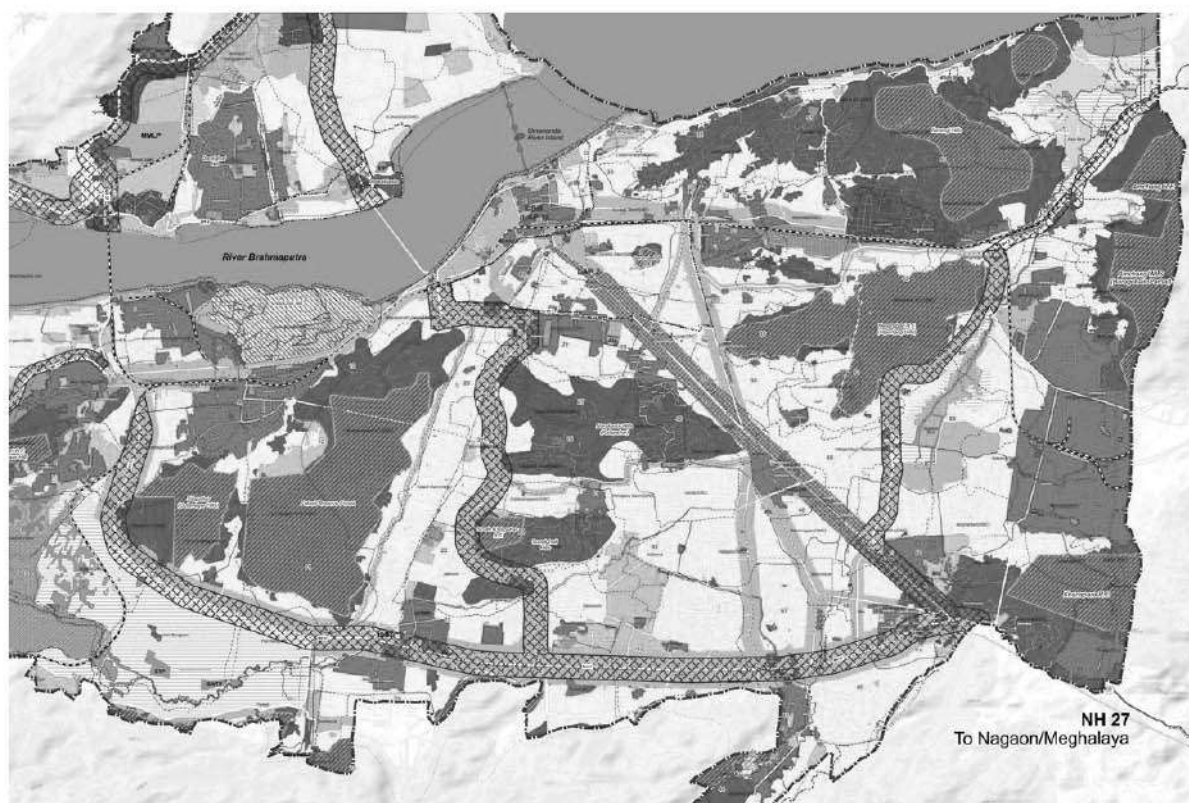


Figure 13-8 Proposed Mixed use and Commercial zones on major arterials of the city

GS road being and oldest iconic commercial mixed use corridor of Assam connecting Guwahati and Shillong is been preserved with the same character to retain the vintage economic skyline of the city. The entire corridor is been influenced by commercial character upto 150mt either side of the GS road.

13.7.7 Transit Oriented Development (TOD) for densification and ease of mobility

The provisions of TOD can referred in section 5.17.2 of Chapter 5 in GMP 2045 Vol.1.

13.7.8 Transferrable development rights (TDR) as a planning tool

TDR means an award specifying the Built-Up Area (BUA) an owner of a site or plot can either sell or utilize - in-situ / elsewhere, in lieu of the land foregone on account of surrendering/ gifting land free of cost to the ULB's (Municipal Body, Urban Improvement Trust, Urban Development Authority), required to be set apart for public purpose as per the Master Plan or for road widening, recreational use zone, etc. The award is in the form of a TDR Certificate issued by the Competent Authority. The TDR Certificate inter-alia should mention the area surrendered and the cost of that area as per the circle rate. These certificates are regulated under the building Bye-Laws or in conjunction with TDR guidelines framed by State Governments from time-to-time.

TDR is a compensation in the form of Floor Area Ratio (FAR) or development rights which shall entitle the owner for construction of a built-up area subject to provisions in policy. This FAR credit shall be issued in a certificate which shall be called as Development Right Certificate (DRC).

The DRC shall be issued by Authority and endorsed thereon in writing in figures and in words, the FAR credit in square meters of the built up area to which owner or lessee is entitled, the place from where it is generated, and the rate of that plot as prescribed in the Circle Rates issued by the Revenue Department for the concerned year.

Trading of transfer of TDR shall be limited to the boundary of the Master Plan area.

The key observations that emerged from the reviewing national and international experience of implementing TDR policy and consultations are postulated in this section.

I. Globally, TDRs have been used as a policy instrument for curtailment of expenditure inlieu of land acquisition or due to any restriction imposed on allowable FSI/ BUA.

II. In India, TDR policy has been introduced by amending the relevant Municipal Act/Town Planning Act/ building rules by some States. The TDR is, in general, functioning as one of the elements to achieve an overarching urban development objective.

III. The TDR method is being used as an incentive for various public purposes like- Development of green spaces- parks/ open spaces/playgrounds /water bodies etc. as per the provision of master plan/ sector plan.

- Development of roads including road widening and strengthening of other trunk infrastructure
- Development of public parking lots
- Development of city level facilities/other public purposes as per Master Plan proposals
- Slum rehabilitation scheme
- Public housing redevelopment
- Development of affordable houses under State Affordable Housing Policy
- Preservation of historical buildings/ landmarks/ heritage structures etc.
- Conservation of water bodies and lakes

In future, TDR may also be not just as an alternative to acquire land for public purposes but also to build them.

IV. There are apprehensions among land/property owners about economic value of TDR.

TDRs certificates have FSI credits, but their monetary value depends on the overall property market in the city and hence is uncertain. They may also not provide for a timely compensation as the suitable buyers may not be available when money is required by the DRC holders. Therefore, a mechanism of ensuring the value of DRC within the time frame of the given Master plan/ development control regulations, re-valuation/ verification after such time frame expires, hand holding of citizens particularly senior citizens in terms of information and techno-legal aid etc. may be built into the TDR policy to ensure citizen acceptance, prevent fraudulent transactions and also enhance the commercial value of TDR certificates.

13.7.8.2 Guiding Principles

A set of principles are outlined in this section to guide the process of preparation of TDR policies and enable them to ensure its success and acceptability by the State/ City Government.

I. Any TDR policy can be effective when it meets two basic conditions simultaneously.

Firstly, the landowners should be voluntarily willing to accept the TDRs in lieu of the monetary compensation under the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (LARR), 2013. Secondly, the city should have a real estate market wherein private sector developers / real estate market players are interested to buy TDRs to utilize them in designated receiving zones – The basic concept of Demand & Supply.

Therefore, simply adopting a TDR policy does not warrants its success. The policy instrument shall primarily be effective when:

- Developers want to buy DRCs and transfer them to receiving areas; and
- Landowners are willing to sell DRCs while permanently restricting their land

II. The strategic selection of 'Sending zone' and 'Receiving zones' lays the foundation stone for the success of a TDR policy. The ULBs/ Authorities need to well-define the sending and receiving zones based on the market demand assessment and the infrastructural carrying capacities of the receiving zones

III. Furthermore, while demarcating both these zones, the key questions to discuss would be a) why the development rights should be sent from a particular zone, and b) where it will be utilized in the city so that development happens in a planned manner. Depending upon the demand in the city, the sending and receiving zones may be also be same with differential possibilities of utilizing the DRC.

IV. The ULBs/ Authorities should ensure regulatory and policy level consistency to signal confidence to the market participants regarding TDR instrument. They should effectively communicate to the market participants regarding future incremental FSI/BUA in the receiving areas and that this would be achieved in a predictable and a transparent manner. To instill this confidence in the market participants, the ULBs/ Authority may add a dedicated chapter on TDR in the development control regulations of the plan period elaborating the conditions where TDR may be applicable, its capping, utilization norms etc.. Once the period concludes, the TDR